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**| RESEARCH ARTICLE**

## **Effects of Covid-19 Pandemic on Performance of Micro and Small Enterprises (MSEs): A Case of Agri-Businesses in Machakos County, Kenya**

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**| ABSTRACT**

The main objective of the study was to establish the effects of the COVID-19 pandemic on the performance of agribusiness MSEs in Machakos County, Kenya. The study utilized a descriptive research design. The unit of analysis was the agribusiness MSEs involved in mango, avocados, citrus, and dairy value chains. Purposive sampling and simple random sampling were employed, and 198 suitable responses were received. The study identified high operational costs, market inaccessibility, price fluctuations, inadequate cash reserves, and increased competition as the major business risks associated with the COVID-19 pandemic. The study showed that the effects of the COVID-19 pandemic on the performance of agribusiness MSEs in Machakos County were not uniform but value chain dependent, with avocados, mangoes, and citrus being the most affected and the dairy sector experiencing the least effects of COVID-19 pandemic. The major effects of the COVID-19 pandemic included reduced revenues, market inaccessibility, increased spoilage, inaccessible supplies, increased cost of operations, and information gaps leading to shrinkage in profitability. Setting aside cash reserves, using courier services for deliveries, and direct selling were the main coping strategies for the COVID-19 pandemic's effects on businesses. Additionally, adequate stocking and online selling were also used. Moreover, temporary business closure, selling through agents, and value addition were embraced. Pooling of transport with other traders, door-to-door sales, having direct contracts with buyers, selling through cooperatives, and online sales emerged as the main alternative business strategies that have persisted during the pandemic. Reduction in traded volumes, market diversification, collective buying of inputs, and collective marketing have also persisted post-pandemic.

**| KEYWORDS**

Performance, MSEs, Agribusiness

**| ARTICLE INFORMATION**

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### **1. Introduction**

The impact of COVID-19 on food supply chains has prompted increasing reflection and attention on the global food system and attracted the attention of both scholars and practitioners during and after the pandemic (e.g., FAO, 2020; Zurayk, 2020). Globally, the COVID-19 pandemic resulted in unprecedented stresses on food supply chains, creating profound challenges for farm labor and production, processing, transport, and logistics, as well as major shifts in demand and consumption (OECD, 2020a). Further, the COVID-19 pandemic affected the essential flow of food from producers to consumers and put fresh food production and the supply chain at risk of disruption. Some of these effects have persisted post the COVID-19 pandemic era.

Risks perceived by Micro and Small Enterprises (MSEs) are generally far different from those encountered by medium and large-sized enterprises (Thakkar et al., 2009). Likewise, risk perceptions, determinants, impacts, and responses by MSEs vary considerably from one region to the other. MSEs, and especially those in agribusiness by their nature, are highly exposed to higher risks, which require a high level of preparedness and appropriate response for survival. Risk identification presents the first step in formulating

effective supply chain strategies in agri-businesses. Further risk management requires prior planning and sound financial investments, which is not the case with most MSEs.

This study will therefore seek to determine the business risks resulting from the COVID-19 pandemic on agri-business MSEs in Machakos County, Kenya. The study also explored the effects of the Covid-19 pandemic on the performance of agri-business MSEs in Machakos County, Kenya, and the mitigation measures on the Covid-19 pandemic related risks by agri-business MSEs in Machakos County, Kenya. The findings covered the duration during and post pandemic era, which is significant to the Kenya Government and Machakos County Government in Policy making, and to the MSEs in planning for risks, managing risks, understanding the effects of the risks associated with COVID-19 on agribusiness MSEs and in exploring the appropriate mitigation measures.

### **1.1.1 Kenyan Agricultural Sector**

The agricultural sector is Kenya's main economic sector. According to the Central Bank of Kenya (CBK), the sector accounts for 20 percent of the Gross Domestic Product (GDP) and employs over 40 percent of the total population and more than 70 percent of the rural population (CBK, 2023). The sector also accounts for 65% of export earnings and provides livelihood in the form of employment, income, and food security needs for more than 80 percent of the Kenyan population (Njine, 2014). Moreover, the sector contributes to improving nutrition through the production of safe, diverse, and nutrient-dense foods (FAO, 2018). Agricultural production in Kenya is characterized by small scale farming, with 80% of producers operating micro and small enterprises. Thus, agribusiness plays an indispensable role in the country's economy.

### **1.1.2 Priority Value Chains**

In Kenya, horticulture and dairy are two major contributors to the agricultural GDP. Horticulture is by far the largest sub-sector of agriculture, contributing approximately 36% of the Agricultural GDP and 1.45% to the national GDP (Kang'ethe et al., 2019). In Kenya, both vegetable and fruit production have increased significantly in recent years. Data from the State Department of Agriculture showed a positive growth in the horticulture sub sector over the last ten years. For instance, vegetable production increased from 2 million metric tonnes in 2015 to 3.5 million metric tonnes in 2023, while fruit production increased from 3 to 4.5 million metric tons over the same time period (Boon, 2024).

The horticultural sector, including the production of vegetables, is among the leading foreign exchange earners in Kenya. The main vegetables produced in the country are Irish potatoes, tomatoes, cabbages, snow peas, kale, spinach, runner beans, French beans, carrots, broccoli, indigenous vegetables, and Asian vegetables. The export value of vegetables from Kenya averaged KES 6 billion per month in 2023, with monthly values ranging from KES 1.36 billion to KES 7.8 billion.

Despite avocados representing only 10.2% of the total fruit production in the country by tonnage, avocado is the top export fruit product from Kenya, with exports having grown from 40,000 metric tonnes in 2015 to over 100,000 metric tonnes in 2023. This makes Kenya the largest exporter of avocado in Africa, with South African exports coming in a distant second at 50,000 metric tonnes. Mango production, which represents 17.7% of the fruit production (in tonnage) in the country, takes the third export spot. Mango export grew from 15,000 metric tonnes in 2015 to 25,000 metric tonnes in 2023. The second most exported fruit from Kenya is pineapple at 30,000 metric tonnes as of 2023 (Boon, 2024).

Citrus is another fruit of economic importance in Kenya. Citrus is a wider name for several species, such as pomelo, lemon, citron, Tangerine, mandarin, and grapefruits, among others (Munywoki & Munywoki, 2022). The long-term average annual rate of increase in citrus production has been 12.06%, with its production standing at 343,898 metric tonnes as of 2022 (World Data Atlas, 2024). The annual export of citrus from Kenya is about 1% of the total production (FAO, 2021). The other equally important agricultural sub sector is the dairy. Currently, with annual production of at least 5.7 billion liters of milk (Ministry of Investments Trade and Industry (MITI), 2023), the dairy sub-sector is experiencing one of the highest growth rates, estimated at 3 to 4 % annually (MOA, 2021). The sub sector contributes at least 12% of agricultural GDP, 44% of livestock GDP, and 4% of National GDP and supports approximately 1.8 million rural households in addition to over 700,000 jobs along the dairy value chain (MITI, 2023).

### **1.1.3 Machakos County and the Priority Value Chains**

In Machakos County, agribusiness plays an important role in employment creation and food supply, both to the county and to the nation. Machakos County is a major producer of fruits, vegetables, and milk. For instance, the county is the second leading producer of mangoes in Kenya, with 803,533 trees and an annual output of 67,320 metric tonnes, valued at KES 835,580,274 (MOA, 2023). Mango is an important crop in the County for income generation among farmers. The fruit is traded locally and also exported to other countries.

Machakos County produces 3,120 metric tonnes of avocado valued at KES 180 million. This makes Machakos county the 4th largest avocado producing county in Kenya after Muranga county, which processes 40% of the Kenyan avocados, Nyeri, and Kisii counties. Production of the citrus family of fruits in Machakos county was 7,653 metric tonnes, valued at KES 267 million in 2023 (MOA, 2024). This consisted of 5,328 tonnes of oranges, 1,378 tonnes of tangerines, and 948 metric tons of lemons.

In Machakos County, the production of leafy vegetables is estimated at 89,811 metric tonnes, valued at KES 4.47 billion, making vegetable production and marketing a significant source of income and livelihood for more than 250,000 households (MOA, 2024). The other priority agricultural value chain in Machakos County is milk. Annual milk production is estimated at 38 million liters, which is valued at Ksh. 2.3 billion (GOK, 2023). In the county, the dairy subsector directly employs more than 15,000 smallholder farmers and creates an additional 7,700 farm jobs and 3,500 jobs along the milk handling and marketing value chain nodes (Muriuki, 2011). These incomes account for nearly 50% of the total gross value of livestock products in the county. Dairy production in the county is characterized by small-scale farming, with most farmers having between two and four animals, which is an indication of micro and small enterprises.

#### ***1.1.4 Micro and Small Enterprises (MSEs) Agribusiness Enterprises in Kenya***

There are 7.4 million MSEs operating in Kenya. About 98% of the MSEs are operating as micro enterprises that employ less than 10 people in each enterprise. The medium enterprises account for only 0.2% of Micro, Small and Medium Enterprises (MSMEs) in the economy (Mulae, 2020). The majority of these MSEs are in the agricultural sector, and at least 80% of them are micro enterprises (FAO, 2018). The importance of MSEs in the agricultural sector in terms of job creation and income generation has been widely recognized, and policy makers have given primary attention (Endris & Kassegn, 2023).

MSEs in the agricultural sector often run under multiple obstacles and high levels of uncertainty in the business environment, hindering their full contribution to the national income, employment, and export performance (Endris & Kassegn, 2023). The escalating development of micro and small enterprises is further offset by a strange rate of enterprise failure in Kenya. Nearly 60% of the MSEs fail within the first few months of operation, and approximately 80% to 90% of MSMEs fail within 5-10 years (Waweru & Ngugi, 2014). The contribution of MSEs in reducing unemployment and poverty is limited due to the risks associated with production, marketing, financial, human capital, and environmental risks (Velandia et al., 2009).

Risk perceptions, determinants, response strategies, and their effects on the performance of agricultural enterprises have been well highlighted in extant literature. However, the majority of these studies have focused on limited geographical scopes (FAO, 2017; Hatab et al., 2020; Magaji et al., 2021; Ntare et al., 2022; Sukiyono et al., 2023) and limited value chains (FAO, 2017; Sukiyono et al., 2023). Further, most current studies on the subject have been on small and medium enterprises without including micro enterprises (Alexender et al., 2019; Anon, 2021; Hatab et al., 2020; Ogidi & Otopo, 2020). It is clear that there is a lack of specific studies on this subject among micro and small enterprises in the in-agribusiness sector in Kenya, specifically in Machakos County. The contextual and value chain specific peculiarities present the need for investigating the effects of the Covid-19 pandemic on the performance of MSEs Agribusinesses in Machakos County due to the significant role they play in the economy of the area.

This study, therefore, sought to establish the effects of the Covid-19 pandemic on the performance of MSEs Agribusinesses in Machakos County, Kenya. Specifically, the study sought to determine the major business risks associated with the COVID-19 pandemic on agribusiness MSEs in Machakos County, Kenya, to identify the effects of COVID-19 pandemic on the performance of agribusiness MSEs in Machakos County, Kenya; and to determine the mitigation strategies for COVID-19 related risks by agribusiness MSEs in Machakos County, Kenya. The findings will be significant to the Kenya Government and Machakos County Government in Policy making and to the MSEs in planning for risks, managing business risks, and exploring the mitigation measures.

#### ***1.2 Study Objectives***

The general objective of this study was to establish the effects effect of Covid-19 pandemic on the performance of MSEs Agribusinesses in Machakos County, Kenya.

The study was guided by the following specific objectives :

- 1) To determine the major business risks associated with COVID-19 pandemic on agribusiness MSEs in Machakos County, Kenya.
- 2) To Identify the effects of COVID-19 pandemic on performance of agribusiness MSEs in Machakos County, Kenya.
- 3) To determine the mitigation strategies for COVID-19 related risks by agribusiness MSEs in Machakos County, Kenya.

## 2. Literature Review

Several studies have tried to highlight risk perceptions, determinants, response strategies, and their effects on performance. For instance, Alexander et al. (2020) explored the impact of COVID-19 on the small business landscape in the United States. The study was a survey of more than 5,800 small businesses that were members of Alignable, a network of 4.6 million small businesses. The study focused on how small businesses adjusted to the economic disruptions resulting from COVID-19 pandemic. The finding suggested that the pandemic had already caused massive dislocation among small businesses just several weeks prior to the availability of government aid through the Coronavirus Aid, Relief, and Economic Security (CARES) Act. Across the full sample, 43% of businesses had temporarily closed, and nearly all of these closures were due to COVID-19 pandemic, which led to reductions in demand and employee health concerns, causing disruptions in the supply chain. On average, businesses reported having reduced their active employment by 39%. The decline was particularly sharp in the Mid-Atlantic region (which includes New York City), where 54% of firms were closed and employment was down by 47%. The study was a survey. The current study broadened the scope beyond COVID-19 pandemic. It also heightened the level of preparedness and possible mitigation measures.

To get insights into how women are coping with COVID-19, AGRA (2020) conducted a voluntary online survey targeting women agri-business (SMEs). The study was conducted between June and July 2020 across four Sub-Sahara Africa regions. The study sought to find out the challenges faced by women in agri-businesses. A sample of 71 women aged between 25 and 54 years from East Africa (54%), Southern Africa (26.78%), West Africa (18.31%), and Central Africa (4.23%) was used. The two-month survey was administered using the survey monkey online platform, which was the fastest, cheapest, and safest method to use, given the pandemic restrictions and directives. The respondents reported the following main constraints faced during the pandemic period: access to markets (71.83%) and access to finance (60.5). To a lesser extent, they also identified employee safety and management, access to labor, farm inputs, and digital communication as additional constraints. These constraints were attributed to the restrictions of movements and the overall economic challenges faced across sectors.

The respondents cited the loss of revenue, loss of customers, loss of workforce, standstill operations, and closure of business as direct impacts of the pandemic on their businesses. Over 56.34% of them anticipated huge revenue loss that would require substantial financing to recover. The disruptions not only affect their livelihoods and agri-business enterprises but also increase women's workloads, threaten their families' wellbeing, and increase incidences of gender-based violence. The study was a survey, and it was conducted online given the large scope; this current study will adopt a descriptive research design, and questionnaires and interview guides will be used to get more insights into the effects of Covid -19 on agri-business (SME) performance. The study established the level of risk management preparedness and possible mitigation measures for the challenges faced by agri-business (MSEs).

In Nigeria, Ogidi and Otobo (2020) examined the effect of Covid-19 pandemic on agri-business (SMEs) in Benue State. The study purposed to examine the effect of COVID-19 pandemic on agribusiness (SMEs) in Benue State, Nigeria. The target population was made up of 415 registered agri-business (SMEs). By adopting multi-stage random sampling, the study obtained a sample size of 204 registered (SMEs). The study employed structured questionnaires in data collection. Data analysis involved both descriptive and inferential statistics. The study found that an increase in the education of agribusiness managers was statistically positive and significant at a value of 5%. The coefficient of the educational level of agribusiness managers was found to be positive and significant at 1%. The study concluded that the COVID-19 pandemic certainly has an effect on agribusiness (SMEs) in Benue State. Awareness of Government policy and incentives regarding the COVID-19 pandemic and agri-business (SMEs) should be encouraged by government agencies, especially the National Orientation Agency. The study was conducted in Nigeria, and it employed multi-stage random sampling, while the current study will take place in Kenya and employ purposive sampling methods. The study looked at how the educational level of the agri-business managers helped them to cope with covid 19 impacts, which was positive.

A study by Anon (2021) assessed the impact of COVID-19 on the Agribusiness (SMEs) and Farming Communities of Ghana, Malawi, Mozambique, Tanzania, and Uganda and found that more than 50% of the agri-business (SMEs) are reporting significant negative impact on their business operations and performance. Uganda -100%, Tanzania & Ghana – 50%, Mozambique – 91% and Malawi – 69%. The study also found that over 40% of agri-business (SMEs) reported a significant negative impact on their ability to source agricultural inputs for sale. Uganda – 90% impact, Tanzania – 60%, Ghana – 40%, Mozambique –The 55%, and Malawi – 62%. The respondents indicated that COVID-19 pandemic had effects on accessing the market. The major effects were that traders were not coming to buy locally, transport disruptions affected the ability to get produce to market, and market closures affected the ability to sell produce. The study had a wide scope, and it investigated only the challenges faced by (SMEs) in these countries, while the current study will specifically target only one county out of the 47 counties in Kenya, and the results will be generalizable. Further, the current study will explore the level of risk preparedness of agribusiness (SMEs) and measures to be taken to address the challenges faced.

A study by Kaberia and Muathe (2021) assessed the effect of the Covid-19 Pandemic on the Performance of Women Owned Micro, Small, and Medium Enterprises in Kenya. The study was a desktop review study in which the researchers reviewed secondary data through an expansive review of available literature, scholarly articles, policy documents, and relevant stakeholder reports. The study found that most (MSMEs) are severely affected in both income and employment, necessitating strategic restructuring to lessen the economic load. Without government support, these ventures cannot endure the calamity. The governments must, therefore, support these MSMEs in matters of income and employment. Further, deliberate efforts to build resilience capability and social support networks are now critical as the only effective business strategies in times of crisis. All businesses must now include a crisis lens as they draw their strategic plans for the coming years. Similarly, small ventures must be facilitated to consider such eventualities in their planning. The study was a desktop review study, and it focused on women operating Micro, small, and medium enterprises in Kenya.

A study by Masagoet al. (2020) on the effects of the COVID-19 pandemic on small and medium-sized enterprises (SMEs) in Narok Town, Kenya, found that most entrepreneurs were actually young. Commencement of (SMEs) was largely dependent on the political environment. Most of the (SMEs) in the region had begun between 2016 and 2018. The number of employees per SME had been effectively reduced to an average of 2, with their daily wages reduced from Ksh. 800 to 200. Both the supply of stock to SMEs and their corresponding demand by buyers were drastically reduced by 77.14% and 91.43%, respectively. There was, however, no significant increment in the pricing of the products ( $P < 0.05$ ). The study found that the net profit margins of the SMEs were reduced from excess of Ksh. 20,000 to about Ksh. 5,000 per month. Other auxiliary services, such as finance lenders, insurance, and marketers, were equally affected. About 54.45% of the SMEs were facing dissolution by their owners if the situation persisted. In conclusion, the researchers found that the COVID-19 pandemic was more of an economic pandemic rather than a health pandemic in the study region. This study was a desktop study analyzing the effect of Covid 19 pandemic on (SMEs) the current study will be a scientific study where the researchers will go to the field to collect data from the respondents, and the data analysis of the findings will be articulated

### **3. Methodology**

The study adopted a cross-sectional descriptive research design. The design was important in describing the context specific characteristics of the study variables (Aggarwal & Ranganathan, 2019). In Machakos County, the distribution of agricultural enterprises mainly follows the suitability of the agro-ecological zones. The production of fruits (mangoes, citrus, and avocados), vegetables, and dairy is mainly in four sub-counties: Mwala, Kathiani, Matungulu, and Kangundo. The study population consisted of 17,878 agribusiness MSEs in the Ministry of Agriculture database who operate in these select sub counties (MOA, 2023). A sample size was determined by Fisher's formula :

$$N = \frac{Z^2 p(1-p)}{e^2}$$

Where N= required sample size; Z= 95% level of confidence, p=proportion set at 0.5, and e = margin of error set at 0.05). This resulted in a sample size of 384. Each sub county was purposively allocated an equal quota of respondents (128). Further, in each sub county, each of the four value chains was purposively allocated an equal quota of respondents (32). Data was then collected randomly from each stratum. Agribusiness MSEs constituted the units of analysis, with the units of observation being the owners/managers of these MSEs.

Suitable responses for analysis were received from 198 questionnaires distributed. This represented a 73.3% response rate, which is considered adequate as per Babbie's recommendation of at least 50% (2007). The questionnaire was developed through a literature review and was subjected to expert opinions and pre-testing before use. Research assistants digitized and administered the questionnaires to the respondents.

Before the actual analysis, the data was cleaned, coded, and entered into SPSS. Two approaches (descriptive survey and correlational research designs) were used to triangulate data for a comprehensive understanding relationship between the constructs.

### **4. Results and Discussion**

#### **4.1. Demographics**

The study achieved a 73.3% response rate. The results of the biodata are presented in Table 1. The results show that the majority of the respondents were males (51.5%). This shows male dominance and is in line with a study by Omondi et al. (2022), which indicated that in Kenya, only 31.4 percent of the SMEs are female owned, while 48 percent are male owned and 17% co-owned by both men and women. This is unsurprising as studies show that while women are the major source of labor for agricultural production, their participation in the commercialization of agriculture, according to David (2021), is highly hampered by cultural

dynamics that undermine women's business aspirations; low levels of formal education and limited technical skills; limited access to productive assets and resources; limited access to finance; and limited access to networks and information. Unfortunately, in most cases in sub-Saharan Africa, business resources are minuscule, and women end up being isolated in small income-generating agricultural businesses (Alunga & William, 2023). They are mostly relegated to unskilled labor, as evident in the fruit, vegetable (Wanjiru, 2021), and dairy sub sectors (Galiè et al., 2022). This demands deliberate measures to ensure the agribusiness sector is gender responsive.

Table 1 also shows that about one third (33.8%) of the respondents were aged between 36 and 45 years, while 28.3% were aged between 46 and 55 years, 13.6% were between 56 and 65 years, 4.5% were above 65 years and 2% between 18 and 25 years. A chi-square test of independence was performed to examine the relation between gender and age. The results of the chi-square test of independence revealed a statistically insignificant difference,  $\chi^2 (5, N = 198) = 6.3, p = .276$ . This means that there was no significant difference in age categorization between the genders. Hence, the MSE owners, whether males or females, are more likely to be older individuals above 35 years old. Only 2 out of 10 are considered youthful (< 35 years). Findings of low participation of the youth in agribusiness corroborate the assertion by Ninson and Brobbey (2023) that the youth generally have a negative perception with regard to agribusiness, which influences their intention and participation in agribusiness. According to Maritim et al. (2019), low participation by youth in agribusiness is aggravated by other factors such as limited access to credit facilities, limited access to land, and the perceived low income and long payback period from agribusiness investments.

Table 1 further shows that results on the education level revealed that the majority of the respondents (45.5%) had secondary education as their highest education level, followed by those with post-secondary certificate (17.7%), primary education (17.2%), diploma (12.6%) and university education (7.1%). Nonetheless, it is worth noting that for those with primary education as the highest academic qualification, 61.8% were females. A Chi Square test of independence was then performed to examine the relation between gender and education level. Even though the overall chi square test showed that the relation between these variables was significant,  $\chi^2 (4, N = 198) = 13.4, p = .009$ , post hoc comparisons using Holm-Bonferroni correction revealed an insignificant difference. Hence, MSE owners (whether males or females) were more likely to have a secondary education level and below. Seven in ten had a hard secondary education, which was the highest education level.

The findings are in line with findings by Osike (2023), which showed that 81.7% of agribusiness SME owners/managers in Western Kenya had a secondary level or below as the highest academic level, with women having the highest number with lower levels of formal education (David, 2021). This is a major concern on the entrepreneurial capabilities of the agribusiness SME owners/operators, as shown by Lackeus (2015) that entrepreneurial activities at primary education levels are rare, and at secondary and tertiary levels, most initiatives are business start-up focused, lacking embeddedness into other teaching subjects. Moreover, the little entrepreneurial concepts and activities introduced at the secondary level are frequent in terms of value creation for other people and are seldom connected to the entrepreneurship domain, its tools, methods, and processes for creating value. Therefore, to ensure success in running agribusinesses MSEs, educational policy makers should consider infusing in education systems at the elementary stages as well as provide out of classroom practical entrepreneurial training for business owners.

Further, the study revealed that about 3 in 10 business owners/operators had experience between 6 and 10 years (29.8%). This was followed by those with between 1 to 5-years' experience (26.8%), more than 15 years' experience (22.7%), 11 to 15 years' experience (17.2%), and less than one year of experience (3.5%). A chi-square test of independence revealed a statistically insignificant difference,  $\chi^2 (4, N = 198) = 2.4, p = .653$  between the genders. The findings mirror the high failure rate associated with SMEs in Kenya due to the lack of adoption of sustainable business strategies (Too, 2019). It can also be observed that, for those businesses with less than 1 year of experience, female owned businesses were the majority (71.4%). However, this number drastically reduces, with sustainability index being higher in male owner enterprises for longer periods. A factor linked to limited access to productive assets and resources; limited access to finance; Limited access to networks and information (David, 2021).

**Table 1: Biodata**

		<b>N</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Sub County	Kathiani	50	58.0%	42.0%	25.3%
	Matungulu	74	55.4%	44.6%	37.4%
	Mwala	74	43.2%	56.8%	37.4%
	Total	198	51.5%	48.5%	100.0%
Age bracket	18-25 years	3	75.0%	25.0%	2.0%
	26-35 years	21	60.0%	40.0%	17.7%
	36-45 years	29	43.3%	56.7%	33.8%
	46-55 years	29	51.8%	48.2%	28.3%
	56-65 years	13	48.1%	51.9%	13.6%
	Above 65 years	7	77.8%	22.2%	4.5%
Highest Education Level	Primary	34	38.2%	61.8%	17.2%
	Secondary	90	43.3%	56.7%	45.5%
	Certificate	35	62.9%	37.1%	17.7%
	Diploma	25	68.0%	32.0%	12.6%
	University	14	78.6%	21.4%	7.1%
Experience in Agribusiness	Less than 1 year	7	28.6%	71.4%	3.5%
	1-5 years	53	52.8%	47.2%	26.8%
	6-10 years	59	47.5%	52.5%	29.8%
	11-15 years	34	55.9%	44.1%	17.2%
	More than 15 years	45	55.6%	44.4%	22.7%

Table 2 shows that the main value chains under study were leafy vegetables (33.8%), milk (28.8%), and mangoes (10.6%). The other value chains included watermelons (4.5%), French beans (4.0%), pawpaw (2.0%), apples (1.5%), tomatoes (1.5%), onions (1.0%), thorn melons (1.0%) and bananas (0.5%). There was no significant difference between the genders in the type of value chain ( $\chi^2$  (3, N = 198) = 0.1, p = .028). Additionally, the data revealed that the majority had no formal employees (58.6%). However, 38.4% of employees engaged between 1 and 5 on a regular basis, and 3.0% engaged more than 6 employees on a regular basis. Even though chi square test showed that there was a difference between the genders ( $\chi^2$  (3, N = 198) = 0.1, p = .028), post hoc comparisons using Holm-Bonferroni correction revealed an insignificant difference. Rambeka and Odollo (2023) observed that the majority of the small and medium-sized enterprises (SMEs) in Kenya are conventionally family businesses owing to their initial source of capital, ownership, and day-to-day operations.

Further, only 13.6% of the traders added value to the products they sold. It can also be seen that 31.5% of milk traders prepare and sell fermented milk (Mala), and 19.2% prepare and sell yoghurt. For vegetable traders, 2.9% chop the vegetables before selling them as a measure of value addition, and 4.4% package their products for sale. The occurrence of value addition did not significantly differ between the genders ( $\chi^2$  (1, N = 198) = .626, p = .420). These findings are in line with findings by Ntale et al. (2014), which showed that most agricultural products are traded in their raw form, with only 6% agricultural produce being value added in Kiambu and Murang'a Counties. This is further in line with findings by Musyoka et al. (2020), which showed that only 33.52% of the farmers in Machakos practised mango value addition.

**Table 2: Background Information**

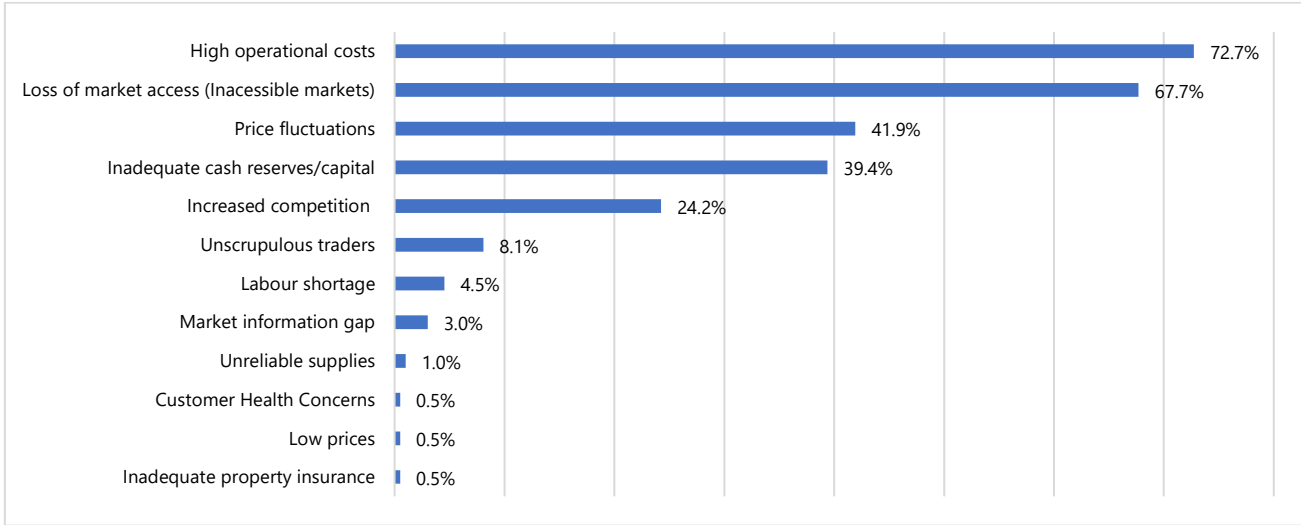
		<b>N</b>	<b>Kathaini</b>			<b>Matungulu</b>			<b>Mwala</b>			<b>Grand Total</b>
			<b>M</b>	<b>F</b>	<b>T</b>	<b>M</b>	<b>F</b>	<b>T</b>	<b>M</b>	<b>F</b>	<b>T</b>	
Primary Value Chain	Mangoes	21	88.9%	11.1%	42.9%	50.0%	50.0%	28.6%	16.7%	83.3%	28.6%	10.6%
	Citrus	14	60.0%	40.0%	35.7%	50.0%	50.0%	28.6%	0.0%	100.0%	35.7%	7.1%
	Vegetables	67	38.9%	61.1%	26.9%	45.8%	54.2%	35.8%	48.0%	52.0%	37.3%	33.8%
	Milk	57	66.7%	33.3%	26.3%	66.7%	33.3%	36.8%	47.6%	52.4%	36.8%	28.8%
	Avocado	16	-	-	0.0%	54.5%	45.5%	68.8%	40.0%	60.0%	31.3%	8.1%

	Others	31	42.9%	57.1%	22.6%	60.0%	40.0%	32.3%	50.0%	50.0%	45.2%	15.7%
Other Value Chains	Apples	3	0.0%	100.0%	33.3%	100.0%	0.0%	33.3%	0.0%	100.0%	33.3%	1.5%
	Pawpaw	4	0.0%	100.0%	25.0%	-	-	0.0%	33.3%	66.7%	75.0%	2.0%
	Thorn melon	2	-	-	0.0%	-	-	0.0%	50.0%	50.0%	100.0%	1.0%
	French beans	8	33.3%	66.7%	37.5%	66.7%	33.3%	37.5%	50.0%	50.0%	25.0%	4.0%
	Bananas	1	-	-	0.0%	100.0%	0.0%	100.0%	-	-	0.0%	0.5%
	Pineapples	2	50.0%	50.0%	100.0%	-	-	0.0%	-	-	0.0%	1.0%
	Tomatoes	3	100.0%	0.0%	33.3%	100.0%	0.0%	33.3%	0.0%	100.0%	33.3%	1.5%
	Onions	2	-	-	0.0%	-	-	0.0%	50.0%	50.0%	100.0%	1.0%
	Watermelons	9	66.7%	33.3%	33.3%	0.0%	100.0%	22.2%	75.0%	25.0%	44.4%	4.5%
Number of employees	None	11	51.9%	48.1%	23.3%	53.5%	46.5%	37.1%	30.4%	69.6%	39.7%	58.6%
	1-5	76	65.2%	34.8%	30.3%	57.1%	42.9%	36.8%	64.0%	36.0%	32.9%	38.4%
	6-10	3	-	-	0.0%	100.0%	0.0%	33.3%	100.0%	0.0%	66.7%	1.5%
	Above 10	3	-	-	0.0%	50.0%	50.0%	66.7%	0.0%	100.0%	33.3%	1.5%
Value addition	Yes	27	50.0%	50.0%	37.0%	40.0%	60.0%	18.5%	41.7%	58.3%	44.4%	13.6%
	No	17	60.0%	40.0%	23.4%	56.5%	43.5%	40.4%	43.5%	56.5%	36.3%	86.4%
Main value-added product	Yoghurt	11	50.0%	50.0%	36.4%	100.0%	0.0%	9.1%	66.7%	33.3%	54.5%	5.6%
	Mala	18	57.1%	42.9%	38.9%	50.0%	50.0%	22.2%	71.4%	28.6%	38.9%	9.1%
	Packaging	3	-	-	0.0%	-	-	0.0%	0.0%	100.0%	100.0%	1.5%
	Chopped vegetables	2	-	-	0.0%	0.0%	100.0%	50.0%	0.0%	100.0%	50.0%	1.0%
Juice	1	0.0%	100.0%	100.0%	-	-	0.0%	-	-	0.0%	0.5%	

#### 4.2 Major Business Risks Associated With COVID-19 Pandemic in Agribusiness SMEs In Machakos County, Kenya.

The respondents were asked to indicate the major business risks associated with the COVID-19 pandemic. Figure 4.1 shows that high operational costs (72.2%) were identified as the major risk associated with the COVID-19 pandemic, followed by market inaccessibility (67.7%), price fluctuations (41.9%), inadequate cash reserves (39.4%), increased competition (24.2%), unscrupulous traders (8.1%), labor shortage (4.5%), market information gap (3.0%) and unreliable supplies (1%). Overall, these led to reduced profitability.



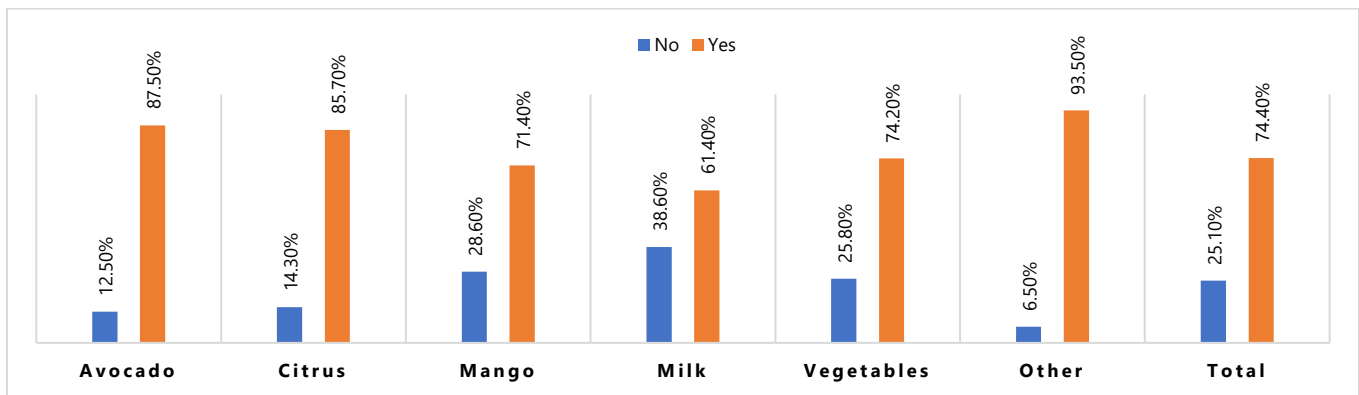


**Figure 1: Covid-19 Pandemic Risks**

These findings are in line with other studies that reported shrinkage in profitability (Masago et al., 2020), increased operational costs, reduced access to finance (Du et al., 2023), uncertainty, and fluctuations (Muriithi, 2021). Therefore, innovative business ideas and strategies, such as proactive planning, alternative financing, and cost cutting regimes, as well as novel distribution channels, should be promoted as measures of ensuring sustainability and growth during times of business turbulence.

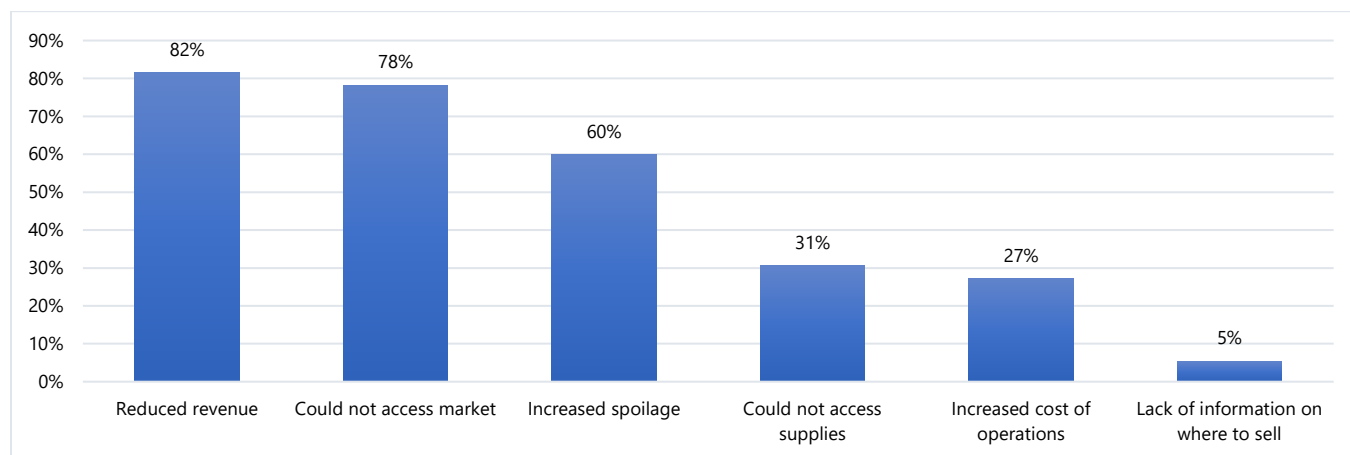
**4.3 Effects of the COVID 19 pandemic on the performance of agribusiness SMEs**

Respondents were asked to indicate whether their businesses were adversely affected by COVID 19 pandemic. Seventy-four-point four percent confirmed that, indeed, their businesses were directly adversely affected by the pandemic. However, avocado traders were the most affected (87.5%), followed by citrus (85.7%), vegetable (74.2%), mangoes (71.4%), and milk traders (61.4%). This difference is associated with the volumes of production for a particular product. The regions studied produce avocado, citrus, and mangoes in surplus (Agriculture Corporation of Kenya, 2023; Muthini, 2015), which cannot be fully absorbed within the local markets and have to be sold in external markets within the county, within the country or exported. The vegetable value chain was mainly affected due to reduced access to input, farm labor, and output markets (Ogada et al., 2021). On the other hand, Machakos County does not produce enough milk for its internal consumption (Ayuya et al., 2022). Whatever is produced is mostly sold at the farm gate and to neighbors. Therefore, for local farmers, restrictions had minimal effect.



**Figure 2: Effect of COVID-19 pandemic on agribusiness SMEs**

For those who indicated that their businesses were affected by COVID-19 pandemic, several multiple reasons were provided. 82% indicated that they experienced reduced revenues, 78% could not access their usual markets, 60% experienced increased spoilage, 31% could not access supplies, 25% experienced cost of operations, and 5% lacked information on where to sell their products.



**Figure 3: Effects of COVID-19 pandemic on agribusinesses**

Chi-square test was used to determine whether the adverse effect of COVID-19 pandemic was in anyway associated with the value chain. Table 3 shows that the null hypothesis of no association between value chain and performance was rejected ( $\chi^2$  (5, N = 197) = 12.77, p = .026).

**Table 3: Chi-Square Tests**

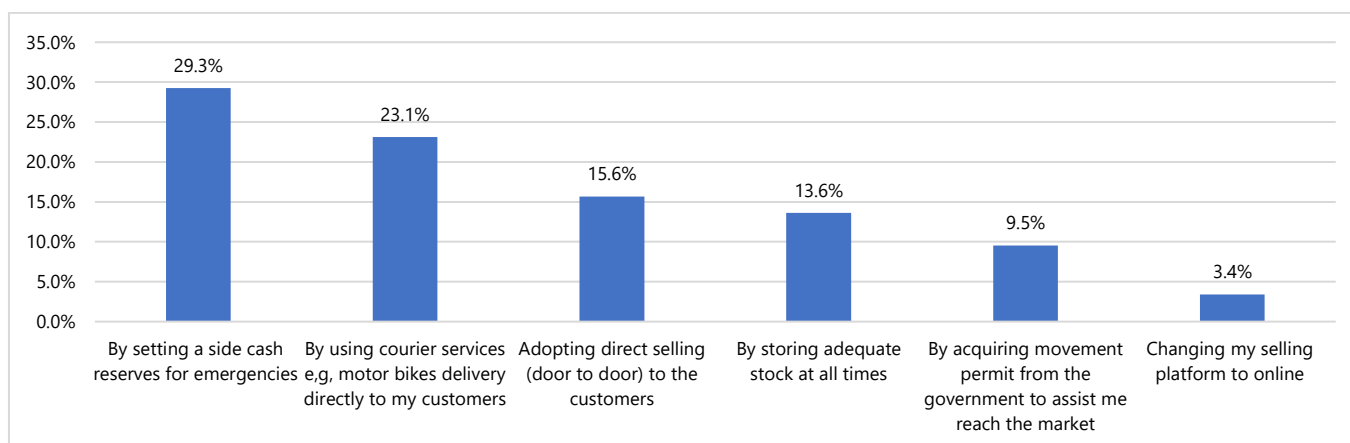
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.779 <sup>a</sup>	5	.026
Likelihood Ratio	14.237	5	.014
Linear-by-Linear Association	2.597	1	.107
N of Valid Cases	197		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 1.78.

Post hoc comparisons using Holm-Bonferroni correction revealed a significant difference for the dairy value chain ( $p=0.0065$ ), indicating that the dairy value chain was less likely affected by COVID-19 pandemic.

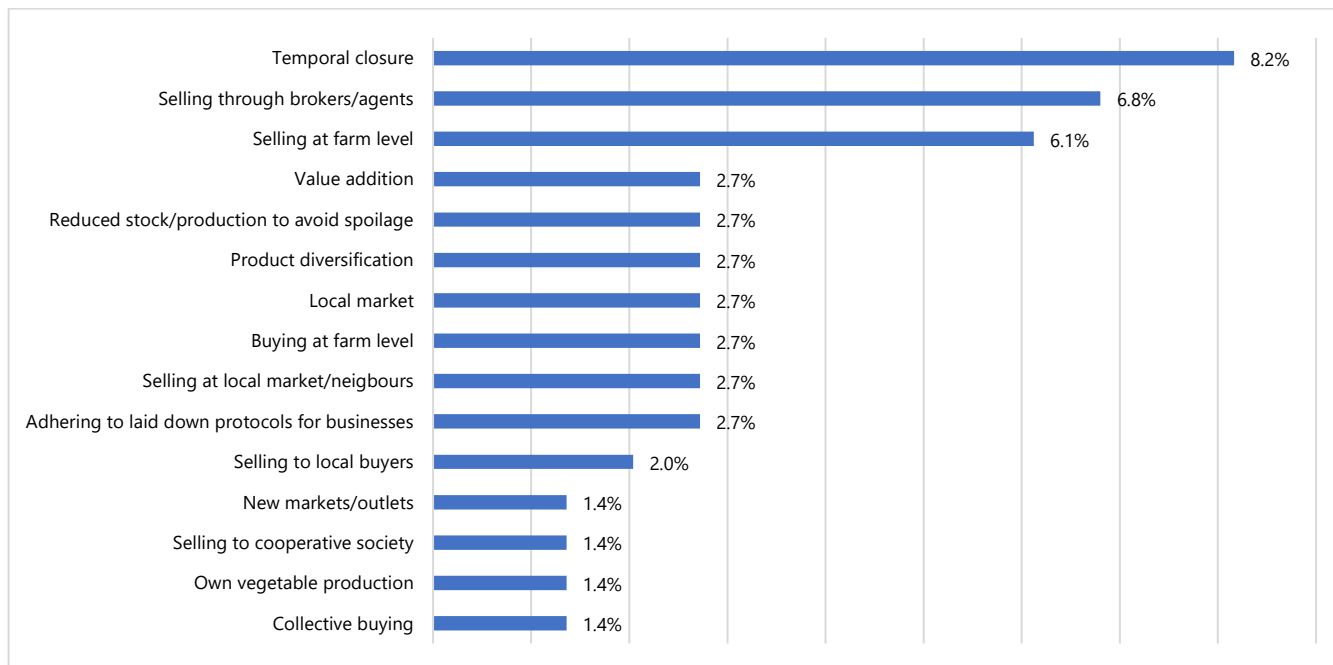
**4.4 Mitigation strategies for COVID-19 pandemic related business risks**

Out of those who confirmed that their businesses were affected by the COVID-19 pandemic, majority identified setting aside cash reserves for emergencies (29.3%), using courier services due to movement restrictions (23.1%), direct selling (15.6%), adequate stocking to cushion against supply disruption (13.6%), getting movement permits from the government (9.5%) and online selling (3.4%) as some of the coping strategies adopted by the agribusiness SMEs in Machakos County.



**Figure 4: Coping Strategies for the Effects of the Covid-19 Pandemic on Businesses**

Additionally, temporary business closure (8.2%), selling through brokers/agents (6.8%), and value addition (6.1%) were among other coping strategies adopted.



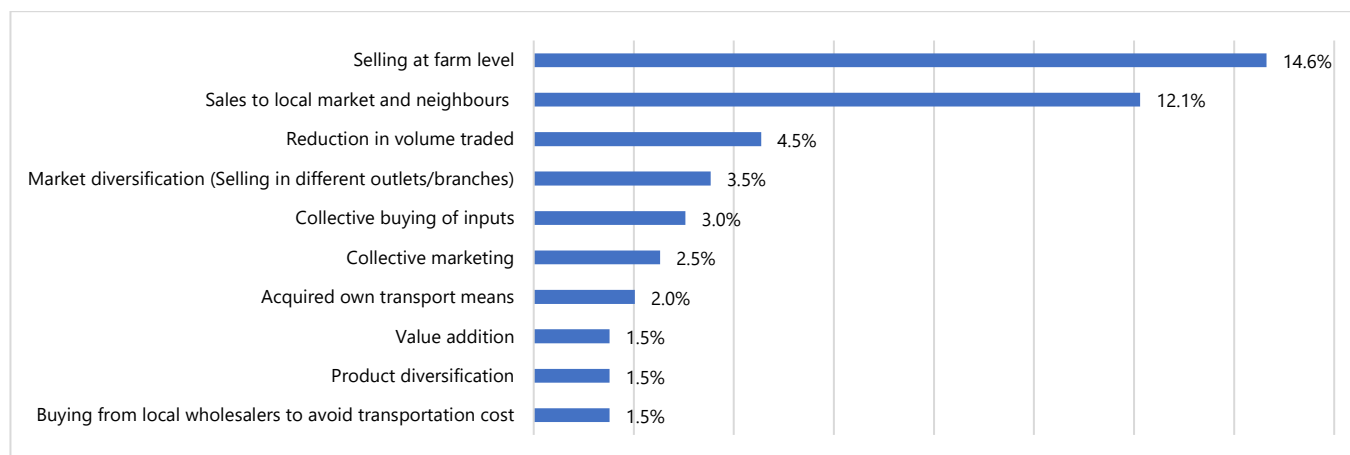
**Figure 5: Other coping Strategies for the Effects of Covid-19 Pandemic on Businesses**

The respondents were then asked to indicate strategies that have persisted from the lessons learned from the effects of the COVID-19 pandemic. The respondents identified pooling of transport with other traders (61.1%), door to door sales (19.0%), having direct contracts with buyers (7.9%), selling through cooperatives (7.9%), and online sales (3.2%).

**Table 3: Post COVID-19 Management Strategies**

Value Chain	Measure	Direct sales (door to door delivery)	Pooling transport with other traders/farmers	Having contract with the buyers	Selling through the cooperatives	Selling online
Avocado	Count	2	5	0	2	1
	%	18.2%	45.5%	0.0%	18.2%	9.1%
Citrus	Count	0	4	0	0	0
	%	0.0%	100.0%	0.0%	0.0%	0.0%
Mangoes	Count	1	7	3	3	0
	%	7.1%	50.0%	21.4%	21.4%	0.0%
Milk	Count	11	14	5	5	0
	%	31.4%	40.0%	14.3%	14.3%	0.0%
Other	Count	4	4	1	0	1
	%	40.0%	40.0%	10.0%	0.0%	10.0%
Vegetables	Count	6	33	1	0	1
	%	9.1%	50.0%	1.5%	0.0%	1.5%
Total	Count	24	77	10	10	4
	%	19.0%	61.1%	7.9%	7.9%	3.2%

Other practices which have emerged from COVID-19 pandemic effects include selling at the farm gate (14.6%), selling at the local market or neighbors (12.1%), reduction in traded volumes (4.5%), market diversification (3.5%), collective buying of inputs (3.0%), collective marketing (2.5%) and acquisition of own means of transportation (2.0) were identified as additional strategies which have persisted post COVID-19 pandemic.



**Figure 6: Other Persistent Management Practices**

## 5. Conclusion

The study revealed male dominance and low participation of youth in the agricultural MSEs. Further, the study showed that most agricultural MSE owners/managers have below secondary level education, with women being more likely to have even lower education qualifications. Moreover, the study revealed a high business failure rate in the sector. Interestingly, more women than men join as new agricultural MSE owners but quickly close these new businesses, with sustainability index being higher in male owned enterprises. A factor linked to limited access to productive assets and resources, limited access to finance, and limited access to networks and information. In addition, the study showed no significant difference between the genders and the type of value chain; the majority had no formal employees, and most agricultural products were traded in their raw form.

The first study objective sought to determine the major business risks associated with COVID-19 pandemic on agribusiness MSEs in Machakos County, Kenya. The study identified high operational costs, market inaccessibility, price fluctuations, inadequate cash reserves, and increased competition as the major business risks associated with COVID-19 pandemic.

The second study objective sought to identify the effects of COVID-19 pandemic on the performance of agribusiness MSEs in Machakos County. First, the study showed that the effects of the COVID-19 pandemic were not uniform but value chain dependent, with the dairy sector experiencing the least effect of the COVID-19 pandemic. However, 8 in 10 were adversely affected by the COVID-19 pandemic. Avocado traders were the most affected, followed by citrus, vegetable, and mango traders. This difference was associated with the volumes of production for a particular product and local market readiness. The local market cannot absorb the surplus production of avocado, citrus, and mangoes. The surplus has to be sold in the external markets within the county, country, or exported. The vegetable value chain was mainly affected due to reduced access to input, farm labor, and output markets. On the other hand, Machakos County does not produce enough milk for its internal consumption. Therefore, for MSEs, restrictions had minimal effect. The major effects of the COVID-19 pandemic included reduced revenues, market inaccessibility, increased spoilage, inaccessible supplies, increased cost of operations, and information gaps.

The third study objective sought to determine the mitigation strategies for COVID-19-related risks by agribusiness MSEs in Machakos County. The finding showed that setting aside cash reserves for emergencies, using courier services for product delivery, direct selling, adequate stocking to cushion against supply disruption, and online selling were used as some of the coping strategies adopted by the agribusiness MSEs in Machakos County during the pandemic. Additionally, temporary business closure, selling through brokers/agents, and value addition were embraced as response strategies. However, based on the lessons learned, several coping strategies emerged during the pandemic and have persisted post pandemic. These include pooling transport with other traders, door-to-door sales, direct contracts with buyers, selling through cooperatives, and online sales. Other include selling at the farm gate, selling at the local market, reducing traded volumes, diversifying the market, collectively buying inputs, collectively marketing, and acquiring one's own means of transportation.

### 5.1 Recommendations:

Based on the findings, a number of recommendations can be made. First, deliberate measures should be made to ensure that the agribusiness sector is gender and youth responsive and supportive. Secondly, to ensure success in running agricultural MSEs, educational policy makers should consider infusing entrepreneurial training in education systems at the elementary stages as well as provide out-of-classroom practical entrepreneurial training for business owners. Thirdly, value addition should be promoted to ensure the most increased earnings for the players in this sector.

Further, innovative business ideas and strategies, such as proactive planning, alternative financing, and cost cutting regimes, as well as novel distribution channels, should be promoted as measures of ensuring sustainability and growth during times of business turbulence. Value chain difference has been identified as a major determinant of the effect and type of response. Hence, future studies can explore other value chains that are not included in this study.

### **5.2 Study Limitations**

The study only focused on four value chains: mango, avocados, citrus, and dairy. Moreover, only four sub-counties of Mwala, Kangundo, Kathiani, and Matungulu, among the eight sub-counties in Machakos County, were investigated. In addition, the study was cross sectional. Therefore, any generalization should take into account these limitations.

### **5.3 Suggestions for Future Research**

The study recommends broadening the scope for future studies in terms of value chains, geographical coverage, and the use of panel data to provide more insights. Further, qualitative investigation of the constructs should be considered to provide more depth.

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