

PROJECT TITLE: INSFEED 2: Insect Feed for Poultry, Fish and Pig Production in Sub-Saharan Africa Phase 2 Project

RESEARCH ORGANIZATIONS INVOLVED IN THE STUDY: Global Agribusiness Management and Entrepreneurship (GAME) Center at the United States International University-Africa

LOCATION OF STUDY: Bungoma, Busia, Kiambu, Nyandarua and Siaya

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REPORT TYPE: Final Technical Report

SUBMISSION DATE: September 30, 2021

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Canada



Australian Government

Australian Centre for
International Agricultural Research



Acronyms

ACIAR	Australian Center for International Agricultural Research
COVID-19	Corona Virus Disease – 19
CULTIAF I	Cultivate Africa’s Future Phase One
CULTIAF II	Cultivate Africa’s Future Phase Two
GAME	Global Agribusiness Management & Entrepreneurship
ICIPE	International Centre of Insect Physiology and Ecology
IDRC	International Development Research Centre
IRB	Institute of Review Ethics
MALL	Metro Agri-Food Living Lab
NACOSTI	National Commission for Science Technology and Innovation
USIU-A	United States International University – Africa

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Acknowledgements

The research team wish to express their gratitude to the following contributors and partners, without whom this project and report would not have been possible:

The International Centre of Insect Physiology and Ecology (ICIPE), International Development Research Centre of Canada (IDRC) and the Australian Centre for International Agricultural Research (ACIAR), for their generous financial support, and the valuable support provided by members of the ICIPE staff – in particular, the continued research and moral support given by Dr. Chrysantus Tanga.

We also acknowledge USIU-Africa's Global Agribusiness Management and Entrepreneurship (GAME) Center project Faculty, Staff and Student research interns, and County-based Trainers, Mentors for their ideas, discussions and support in developing, designing and implementing this project.

1. Executive Summary

While the majority of our Agricultural Training Institutions do a good job providing technical skills from a production perspective, and while business institutions do a good job providing business skills, an integrated link has always been elusive, let alone use of experiential learning approach. The United States International University-Africa (USIU-Africa) Global Agribusiness and Management and Entrepreneurship (GAME) Center was created to fill that gap with the principle of *converting farms into firms*. The Center combines research, academic and practice to provide integrated experiential skills for Agribusiness Entrepreneurs. The Center applies the Living Lab concept where the entrepreneur's business is turned into a learning lab with the trainer, researchers, practitioners, and the learners collectively *co-creating knowledge* along with pertinent technologies and technics of the practice. Unlike other models which focus on transforming subsistence farmers into agricultural producers, the Living Lab model develops entrepreneurs conversant with the urban consumer. Therefore, its *focus* is on markets and consumers, instead of simply output growth; its *crucial drivers* are value addition (profit, people & planet), instead of simply profit optimization; the *mindset* is on product appeal, than just commodity production; *critical competences* are entrepreneurial development, rather than management skills; and it *mainstreams* ethical and gender issues across the training and mentorship.

With funding from the Canadian International Development Research Center (IDRC) and the Australian Center for International Agricultural Research (ACIAR) for phase 1 and further funding for phase 2 of the Cultivate Africa's Future (CultiAf 1 and CultiAf 2), through the International Center for Insect Physiology and Ecology (ICIPE), GAME Center was tasked to carry out an action research with the objective of scaling up and evaluating the. INSFEED 2: Insect Feed for Poultry, Fish And Pig Production In Sub-Saharan Africa – Phase 2. The specific objectives were to:

1. Enhance the capacity of male and female youth in agri-food entrepreneurship through training, mentorship & field counselling to enable them launch or build sustainable Agrifood businesses.
2. Link male and female youth agri-food entrepreneurs with potential funders to enable them secure funds to grow their businesses.
3. Conduct rigorous impact evaluation to determine effectiveness of training, mentorship, funding, gender and other select demographic factors respectively on successful business launch, job creation and food security.
4. Engage policy makers to design, strengthen and (or) improve policy initiatives in addressing barriers to participation in training, gender, access to finance, youth disparities in business and enhancement of food security initiatives

Due to COVID 19 interruptions and delays, the project was only able to measure the effect of COVID 19 on male and female entrepreneurs. The limited timeframe could not allow measurement of the impact of training and mentorship. Following are some of the key research findings.

With respect to **business startup**, the majority of the entrepreneurs (52%) used their own savings to start their businesses, 24% used informal borrowing and own savings to start their businesses, 20% took formal loans, 4% got sponsors while 1 % got government funding. In terms of **product line**, the analysis showed that the number of entrepreneurs on each product significantly changed during COVID 19. The number of entrepreneurs dealing with fish and insect increased during COVID 19 while those of poultry and pigs dropped significantly. Further analysis revealed that number of male entrepreneurs dealing with fish and insect increased significantly ($p < 0.05$) on the other hand, the number of female entrepreneurs dealing with poultry, fish, pigs and insect also significantly dropped

With respect to **group dynamics**, the analysis showed that more male than female were in the group leadership position. However, there was no significant difference in the terms of participation in group decisions by gender nor by county. And in relation to **earning**, the research revealed that earning among group members averaged of 7,215 shillings per month differences in earnings were not statistically significant between male and female entrepreneurs. However, the average sales before COVID 19 significantly dropped by Ksh 14,741 during COVID 19. Interestingly, male entrepreneurs had their average monthly sale going down significantly during COVID 19.

2. Research Problem

The major protein ingredients currently available for animal feed production include soybean meal, fishmeal, fish oil, seed cakes and several other grains, with fishmeal and soybean meal being the major sources. However, the production of sufficient protein for poultry, livestock and fish feed is constrained by limited soybean production due to farm land scarcity and marine overexploitation which reduces availability of small pelagic forage used to produce fishmeal (Tacon & Metian, 2009). Feed cost is already prohibitive, representing 60-70% of production costs. The limitation of resources to produce these increasingly demanded ingredients has doubled their prices during the last decade, while the feed cost is already prohibitive, representing 60-70% of the production costs. It therefore may not be a sustainable option to continue to rely on fishmeal and soybean meal as protein source in animal feed production (van Huis *et al.*, 2013).

Insect-based feed enterprise should provide a reliable source of quality fish feed locally, reduces competition with human foods, and offers a huge potential of growth for the fish feed processors as well as fish farmers in Africa.

While insect rearing techniques in the first phase were successfully established with BSF, crickets and silkworm, further research is required to fine-tune the rearing procedure to achieve traceability and yield requirements for private sector companies. A key research gap to fill was to develop a comprehensive business model with a robust capacity planning potential that enables proper planning and successful and timely delivery (in quality and quantity) of insect based protein to customers placing orders with deadlines and quantities. Business models are indispensable for sustainability and reliability of any commercial insect farming and such models were developed in three agro-ecological zones: Central Kenya (*icipe*, Nairobi), Western Kenya (*icipe*, Mbita) and Central Uganda (Makerere University, Kampala).

The new entrepreneurship opportunities through small and medium-scale insect rearing, feed production as well as poultry, fish and pig farming would create jobs and empower the youth in Uganda and Kenya. By increasing the food supply, reducing hunger and increasing income generation opportunities for small-scale farmers in a sector dominated by women and youth, the project will contribute towards meeting the goals of Pillar 3 (increase food supply and reduce hunger across the region by raising smallholder productivity and improving responses to food emergencies) of the Comprehensive Africa Agricultural Development Plan (CAADP), the Sustainable development Goals 1 (no poverty), SDG 2 (no hunger), SDG4 (promote gender equality) and SDG 8 (decent work and economic growth). The project will also contribute to Kenya vision 2030 and Uganda vision 2040 through the reduction of extreme poverty, job creation for youth, gender equity and environmental sustainability (GoK, 2007; NPA, 2010).

3. Project Implementation

The purpose of this project was to carry out an action research with the objective of scaling up and evaluating the. INSFEED 2: Insect Feed for Poultry, Fish and Pig Production In Sub-Saharan Africa – Phase 2. The specific objectives were to:

1. Enhance the capacity of male and female youth in agri-food entrepreneurship through training, mentorship & field counselling to enable them launch or build sustainable Agrifood businesses.
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4. Engage policy makers to design, strengthen and (or) improve policy initiatives in addressing barriers to participation in training, gender, access to finance, youth disparities in business and enhancement of food security initiatives

4. Project Implementation

The project recruited 50 male and female youth entrepreneurs from five counties from 2 agro-ecological zones where ICIPE has ongoing field work, i.e., two in central Kenya (Kiambu and Nyandarua) and three in Western Kenya (Siaya, Busia and Bungoma). The research team worked with county stakeholders to identify possible sites for the construction of screen houses, one in each of the respective counties.

However, at this early stage of the project, the would fell into the hands of the COVID 19 Pandemic which forced governments to shut down many activities. As a result, the project experienced tremendous delays in implementation. This called for project restructuring including shift from training all members of the group to only training their leaders; providing virtual mentorship instead of face to face and carrying out impact assessment of COVID 19 instead of impact of training and mentorship.

Once the government started to allow movement and small group meetings, the research team worked with ICIPE to construct the screen houses. Once the screen houses were completed, county local based experts who had previously been trained and worked with GAME Center Agribusiness capacity building for youth entrepreneurs, were deployed to provide both training and mentorship for the leadership team of each group. The trained youth leadership was then to work with and train the remaining 45 members of the group.

The training for group leaders was face to face and simplified covering the following modules of training;

- Agribusiness simulation
- Opportunity-based Agri-preneurial mindset
- Agribusiness value chain, marketing and triple bottom line
- ICT application in business
- Agribusiness values and ethics
- Agribusiness formulization and registration
- Business model for sustainable agribusinesses
- Resource mobilization and financing

- Agribusiness growth plan

5. County Capacity Building Reports

After training and mentorship, the trainers/mentors submitted the following respective reports.

5.1 Busia County

The training for group leaders was face to face with lots of practical examples. The availability of both trainer's manual and participant's workbook made it easy for interpretation and understanding. The training was first carried out to the group leaders who were representatives of the bigger group with the bigger group also provided with the workbook for ease of understanding. The participants were able to get the concepts on insect feed as an alternative feed for poultry, fish and pigs with poultry and fish taking the lead in terms of expected demands, it was proved beyond doubt that the black soldier as a feed shall be the way to go in agribusiness for the young entrepreneurs. After every everyday session there were evaluation forms to be filled by the participants. Since there was no technical training on the black soldier there was little to be discussed on the raising of the insect as it was forming the core of the business. The screen house was also not equipped to kick off the project the entrepreneurs were having difficulty to understand the real business.

The training was a milestone towards achieving food security, creating employment since over 100 young entrepreneurs shall be directly get employment from this venture leading to more poultry, fish and pigs being produced at relatively lower costs.

5.2 Bungoma County

The main key observation is that the youth were eager to learn. The three main challenges include but are not limited to; the youths lacked technical knowledge on project, very few youths were trained and poor in record keeping. In Bungoma County the trainers recommended that the youth should have trained on the technical knowledge before entrepreneurial training to relate the new skills with Insfeed as a project. Secondly more youth should have been to effectively trickle down information to the rest and lastly the need to train youths on importance of records

5.3 Nyandarua County

Trainees comprised of five (5) gender sensitively constituted leadership – 3 Males, 2 Females - representing seventeen (17) pioneer members organized as a Self-help group founded in 2016 to pursue in their rural setting, a venture in the vibrant Boda Boda (Motorcycle) transport industry. There was no female registered member in the group until 2019, when the group was approached by USIU Africa concerning proposed alternative venture in Agribusiness Sector, tapping into a niche venture of Insfeeds for Poultry, Pigs and Fish. Given that the project did not start at the time, the group set out to utilize the two non-floored screen houses in crop farming precisely certified potato tubers multiplication and Tomato production to date. After confirmation of start of the USIU/ICIPE Insfeed project in August 2021, the group leaders with assistance from Nyandarua County Government Director of Agribusiness, did a rapid mobilization and recruitment to raise the group membership from 17 to the recommended target of 50 members. 30 members were shortlisted. A list of 21 new members was to be shared to USIU Africa via Trainers prior to start of USIU Africa training program. The group leaders are knowledgeable and skilled, having pursued post high school education. The

attendance and participation of the five trainees was excellent thru out the training period, except for the secretary. Trainees were eager to learn, updated some of their members on call about progress. The following challenges were encountered; Delivery and collection of training materials – USIU Africa executed delivery of the said very bulky package (i.e. 50 Training manual for participants and 2 for Trainers) via parcel Courier ‘Wells Fargo’ company located at the heart of Ol Kalou Town, but about 3.5Km kilometers from the hired training venue. Trainers had to source and pay for taxi to transport the same to venue then seek reimbursement of the expense. Since the venue was booked for Monday 16Th August 2021, Trainers opted to pick the parcel same day, early morning at 7:00Am as communicated and confirmed the company. However, they opened at 9:00Am, far late from their stipulated working hours. The Covid-19 guidelines rendering cut-down of trainees from 50 to 5, caused apathy that led to withholding of the list of 21 members as promised for submission, especially the part mobilized and recruited by the County Director of Agriculture. Due to the frequent postponed start of Agribusiness Training, the leaders were not adequately prepared in planning for both the Training and personal affairs. This especially affected participation of the Secretary of the group whose career schedule crashed with the ultimate training date.. Trainers were pressed to clarify why the **ICIPE Technical Training** could not have taken place consecutively to get members better motivated enable then devise their strategic plan. Virtual mentorship remains a remarkable challenge and costly undertaking on account that some rural trainees don’t possess smart phones, and local / geographical network signal quality and or availability renders trainees’ communication either frequently interrupted or unreachable.

The proposed mitigation measures include but are not limited to; Recruitment, Selection and Training of target group – By virtue of Trainers hailing from the county, their contact to livelihood gets them out extra-County. There is need to contact them early at the planning stage of a proposed project / program to ensure proper contacts are established and maintained across stakeholders thru out the project period. Procurement of hired training venue – its recommended that the secretariat directly works with a known / potential business entity, who is/are then tasked to identify and share 2 or more suppliers (quotations), as opposed to Trainees performing the tasks.

5.4 Siaya County

The insect for feed for poultry, fish and pig production in sub Saharan Africa 2 project funded by ICIPE with grants form IDCRC. The beneficiaries are youth from the counties who are to undergo technical training on production of Black soldier Fly larvae as an alternative protein source for the mentioned livestock. 50 youth were to be trained per Sub County to undertake the project as a business which necessitated their training on Agribusiness. The Siaya Training team on behalf of the USIU chose to identify beneficiary groups from practicing poultry farmer groups. The validated groups were picked from practicing youth poultry farmers affiliated to the Kenya Climate Smart programme. This was expected to build synergies with the programme so that the trainees can eventually use the insect feed products both in their poultry farms and have a market within the other poultry farmers within the program as a start. KCSAP has also shown interest in embracing the inse-feed technology and our trainees would then be a resource within the county

The training was participatory, with participants sharing from their experiences as well as those from the facilitator. The participants were eager to learn knew entrepreneurship skills

The topics covered during the training included; the other four topics were covered by the 2nd facilitator.

- Opportunity based agripreneurial mindset
- Agribusiness growth plan

- Resource mobilization and agribusiness finance
- Business model for sustainable agribusinesses

The training was later graced by the County executive who also witnessed the handing over of training materials to be given to the group members who were not able to attend the training due to the numbers and covid 19 restrictions

Key observations, two groups represented were already practicing poultry and cage fish farming respectively and had already appreciated the fact that feed was the most expensive factor of production for their enterprise.

The other two came from groups with a wider membership of varied enterprises but appreciated the training on business skills that would be help their group members. The group members chose to work on a single business ide and later cascade to the group members. Some of the key challenges for both trainer and trainees had not interacted with the BSF technology, so it was not very easy to project the financial requirements for the project while discussing the business plan. The trainees did not come from one group and varied enterprises so creating a harmony of focus was not easy during business plan preparation. **To mitigate the challenges identified in number,** there is need for the technical training to be done soon in order to facilitate the completion of the business plan. There is also a need to organizing the Alego group as custodians of the screen net at the demonstration site with support. The group members were able to develop part of the business plan by the end of the training, and virtual guidance is still ongoing.

6. Synthesis of Research Results to Date

This synthesis is organized by the research objectives, with details in the Detailed Findings and Analysis Report

6.1 Related to Impact Assessment.

Below are the key findings from the research project focusing on the impact of COVID 19 on entrepreneur’s performance.

Gender.

Out of the 125 respondents interviewed during the baseline, it was found that 67% were males while 33% were female as shown in figure 1 below.

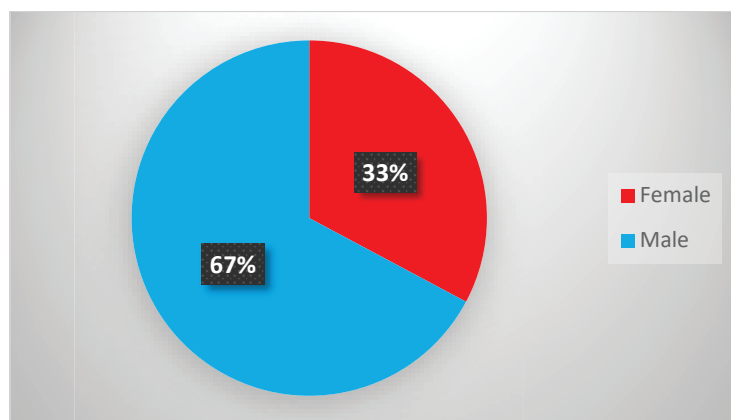


Figure 1: Gender

Change in Product Line

The analysis showed that the number of entrepreneurs on each product significantly changed during COVID 19. The number of entrepreneurs dealing with fish and insect increased during COVID 19 while those of poultry and pigs dropped significantly. The results are as shown in the table 1 below

Table 1: Change in Product Line

Product	Before COVID 19	During COVID 19	t-test	P-Value
Poultry	75%	69%	2.974	0.004
Fish	10%	14%		
Pig	9%	8%		
Insect	6%	9%		

Change in Product Line by Gender.

Further analysis revealed that number of male entrepreneurs dealing with fish and insect increased significantly ($p < 0.05$) on the other hand, the number of female entrepreneurs dealing with poultry, fish, pigs and insect also significantly dropped.

The analysis also showed that more males joined other businesses while more female dropped other business as shown in table 2 below

Table 2: Change in Product Line by Gender.

Business	Female		Male	
	Before COVID 19	During COVID 19	Before COVID 19	During COVID 19
Poultry	50.0%	62.9%	53.2%	41.3%
Fish	2.8%	2.9%	9.1%	13.3%
Pig	5.6%	5.7%	6.5%	5.3%
Insect	2.8%	2.9%	5.2%	8.0%
Other Businesses Combined	38.9%	25.7%	26.0%	32.0%
Total	100.0%	100.0%	100.0%	100.0%
Significance of Change (t-test)	P=0.000: Significant		P=0.002: Significant	

GROUP DYNAMICS

In charge of agribusiness.

The analysis showed that 76% of the businesses are headed by entrepreneurs themselves as shown in the table 3 below.

Table 3: In charge of agribusiness

16. Who is in charge of your agribusiness?		
In charge	Frequency	Percent
Yourself	85	76%
Father	6	5%
Mother	5	4%
Spouse	4	4%

Employer	2	2%
uncle	2	2%
An employer	1	1%
Aunt	1	1%
Brother	1	1%
business owner	1	1%
chairman of the greenhouse group	1	1%
Chairman of the greenhouse project	1	1%
Friend	1	1%
Sister	1	1%
Total	112	100%

Position in the Group

It was found that 35% of the entrepreneurs are group members while 65% are just group members in figure 2 below

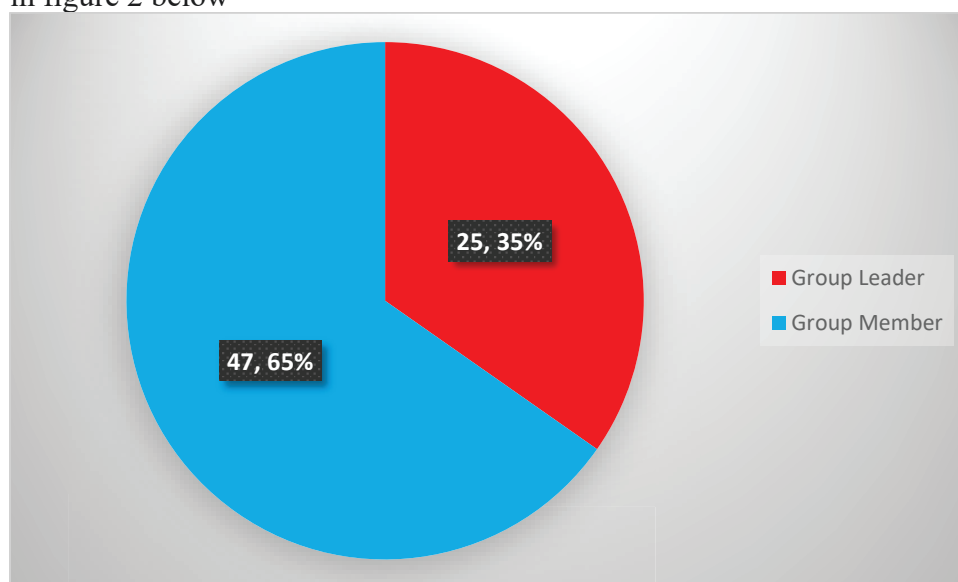


Figure 2: Position in the Group

Position in the Group by Gender

Further analysis showed that more male than female is in the group leadership position as shown in figure 3 below

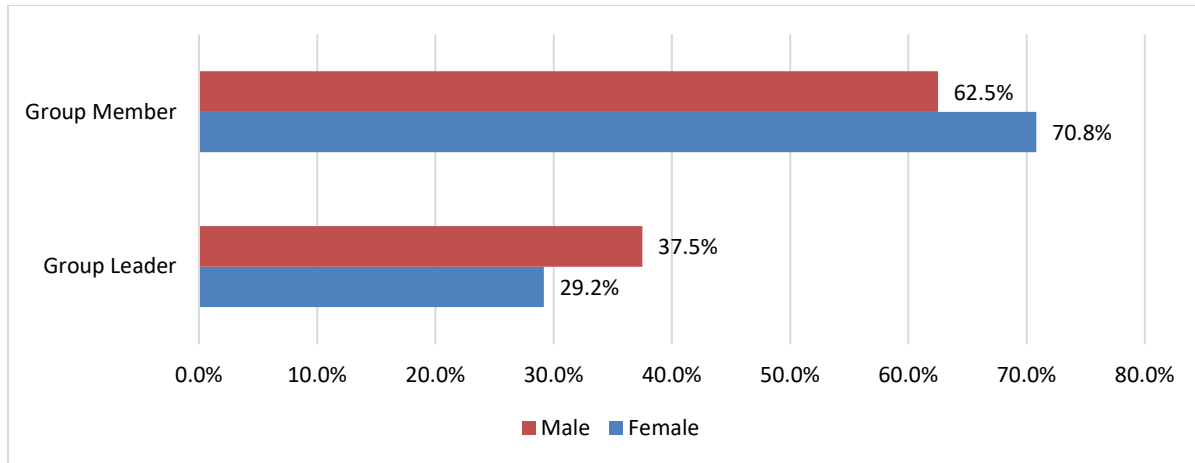


Figure 3: Position in The Group by Gender

Opportunity to participate in the group decision making

The analysis showed that over 80 % of the entrepreneurs got the opportunity to participate in the group to a moderate and to a great extent as shown in the figure 4 below

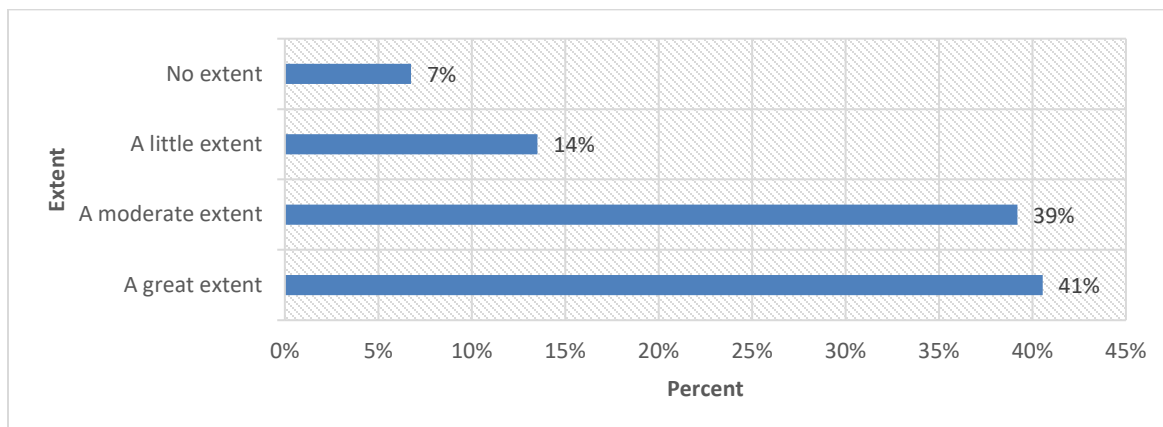


Figure 4: Opportunity to participate in the group decision making

Opportunity to participate in the decision making by Gender

Further analysis showed that there is no significant difference in the terms of participation by gender as shown in table 4 below

Opportunity to participate in the group decision making by Gender

	Gender		t-test	P-Value
	Female	Male		
A great extent	36.0%	42.9%	0.227	0.821
A little extent	16.0%	12.2%		
A moderate extent	44.0%	36.7%		
No extent	4.0%	8.2%		
Total	100.0%	100.0%		

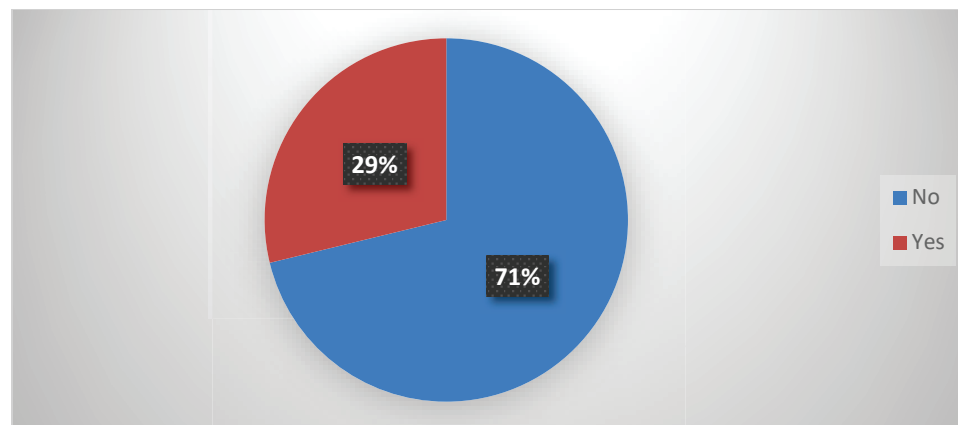
Extent by County

Further analysis showed that there is no significant difference in the terms of participation by county as shown in table 4 below

Extent	County					F-test	Pvalue
	Bungoma	Busia	Kiambu	Nyandarua	Siaya		
A great extent	50.0%	7.7%	62.5%	45.5%	40.0%	2.453	0.54
A little extent	18.8%	30.8%	25.0%	0%	4.0%		
A moderate extent	25.0%	38.5%	12.5%	54.5%	52.0%		
No extent	6.3%	23.1%	0%	0%	4.0%		
Total	100.0%	100.0%	100.0%	100.0%	100.0%		

Money Earned Directly from The Insect for Feed Group.

71% of those in insect for feed group do not earn directly from the group while 29% are earning directly from the group.



19a) Do you earn some money directly from the insect for feed group business?

However, those earning from the group are earning an average of 7,215 shillings per month.

Statistics	
19b) If yes, how much?	
N	19
Mean	7215.79
Median	5000
Mode	10000
Std. Deviation	7828.528
Minimum	100
Maximum	35000

Earning by Gender

Further analysis by gender showed that earnings of male entrepreneurs in the group is not statistically significantly different from that of female entrepreneurs

Earning by Gender.

Gender	Average Amount Earned	Std. Deviation	t value	Significance at p=0.05
Female	5400.00	4219.005	-5.93	Not significant
Male	7864.29	8812.457	P=0.561	

Earning by County.

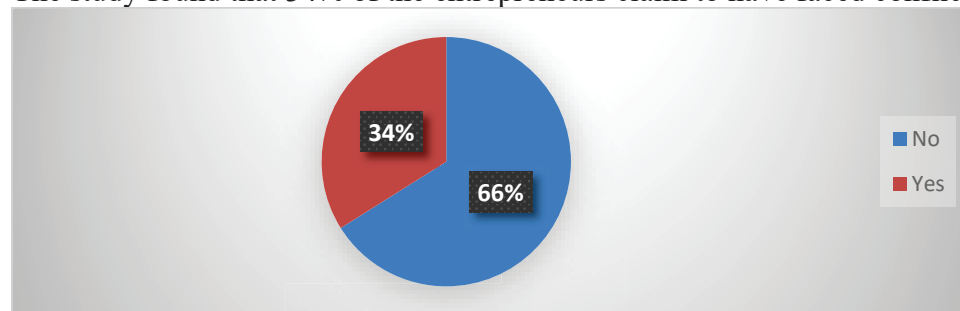
Further analysis by gender showed that earnings of male entrepreneurs in the group is not statistically significantly different from that of female entrepreneurs

Earning by County.

County	Average amount earned	Std. Deviation	F-value	Significance of p-value at 0.05
Bungoma	4150.00	4060.788	0.386 P= 0.765	Not Significant
Busia	5450.00	6434.672		
Kiambu	7500.00	3535.534		
Siaya	9210.00	9965.323		
Total	7477.78	7969.320		

Conflict in the Group.

The study found that 34% of the entrepreneurs claim to have faced conflict in the group.



20a) Do you face any conflict in the insect for feed group?

Conflict by Gender.

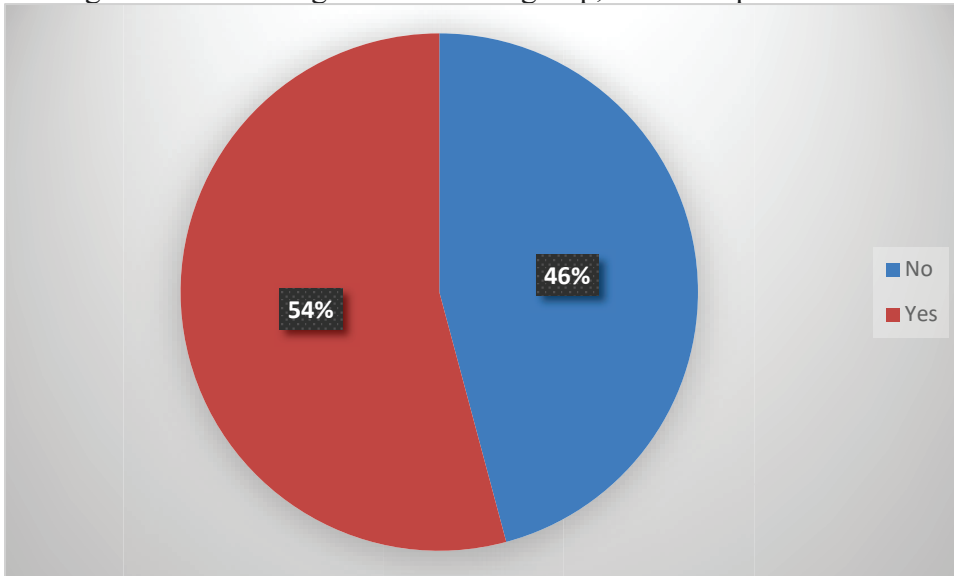
The analysis by gender further showed that there is no significant difference in the number of male and female facing the conflict.

		Gender		t-value	Significance of p-value at 0.05
		Female	Male		
Do you face any conflict in the insect for feed group?	No	76.5%	61.5%	-1.077	Not Significant
	Yes	23.5%	38.5%		

Total	100.0%	100.0%		
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Conflict Resolution.

Among those who facing conflict in the group, 54% accepted that the conflicts were resolved

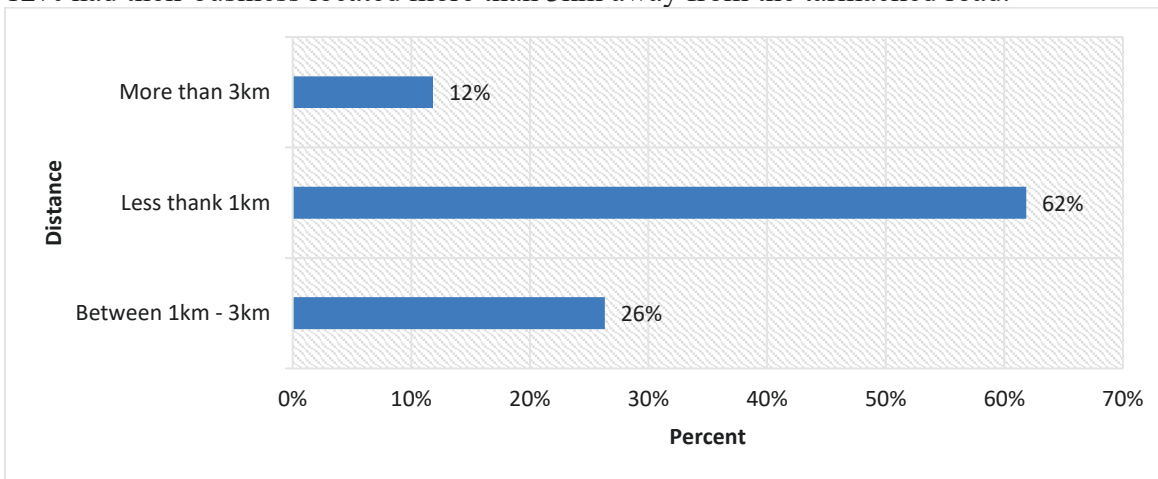


20b) If yes, was the conflict resolved?

INFRASTRUCTURE ACCESS.

Accessibility of the Tarmac Road

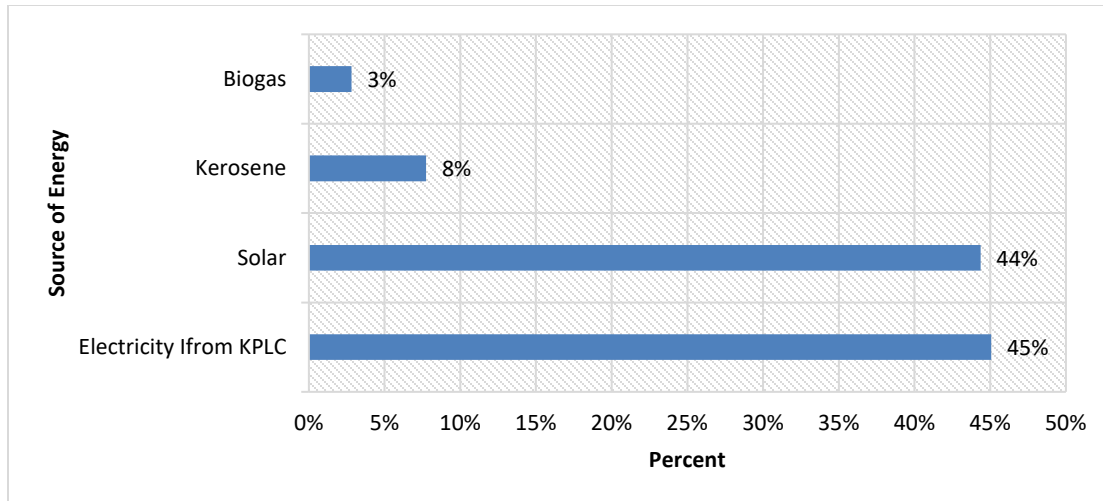
The study showed that the businesses of the 62% entrepreneurs were less than 1 Km away from the tarmac road, 26% had their business located between 1km-3km away from the tarmacked road and 12% had their business located more than 3km away from the tarmacked road.



21. How far is your group insect feed business from the nearest tarmac road?

Source of Energy

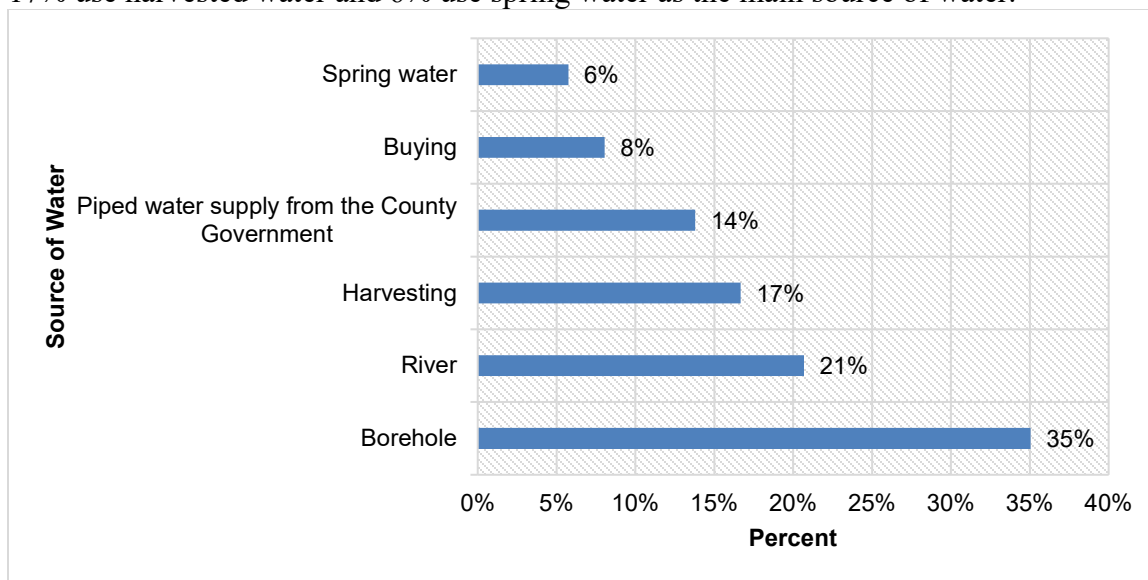
The study found that majority of the entrepreneurs (45%) use electricity from KPLC as the main source of energy, 44% are using solar, 8% are using kerosene and 3% are using biogas.



22. What is your source of energy for your agribusiness

Source of Water.

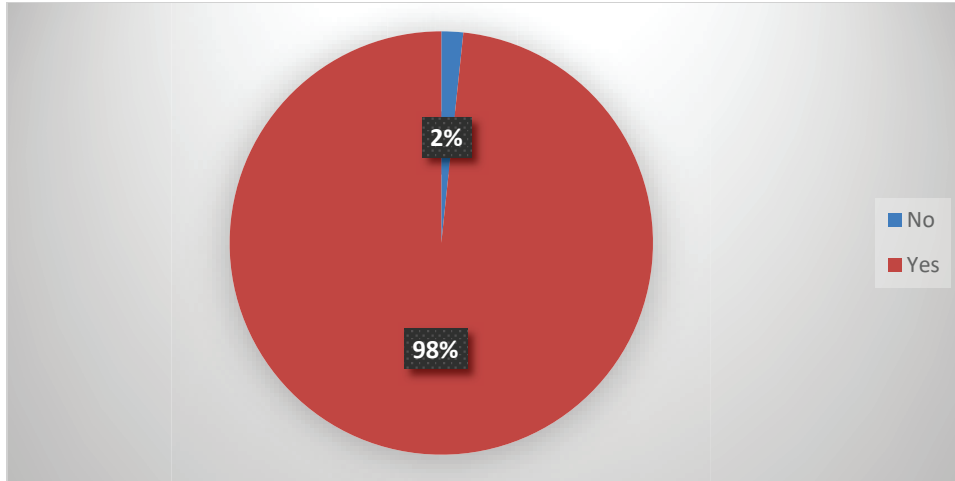
The study showed that majority of the entrepreneurs (35%) use borehole as the main source of water for their businesses followed by 21 entrepreneurs who use rivers as the main source of water, 17% use harvested water and 6% use spring water as the main source of water.



23. What is your source of water for your agribusiness?

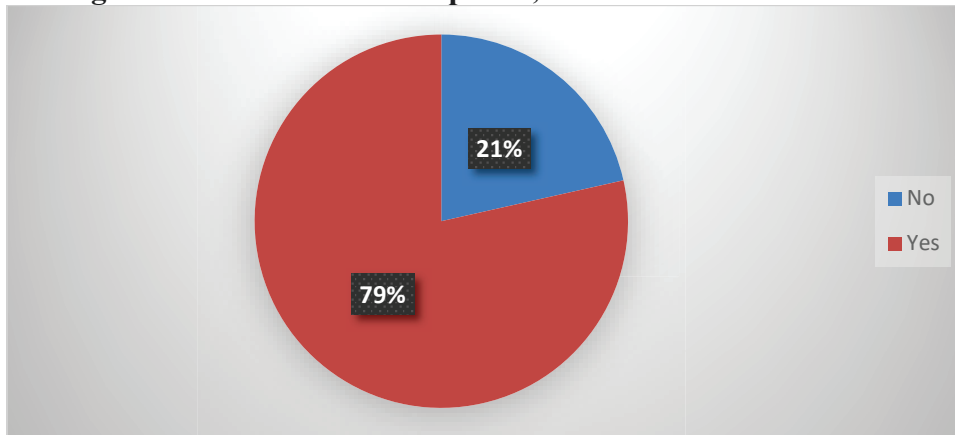
OWNING A MOBILE PHONE.

In terms of owning a mobile phone, it was found that 98% of the entrepreneurs own a mobile phone



24a). Do you own a Mobile Phone?

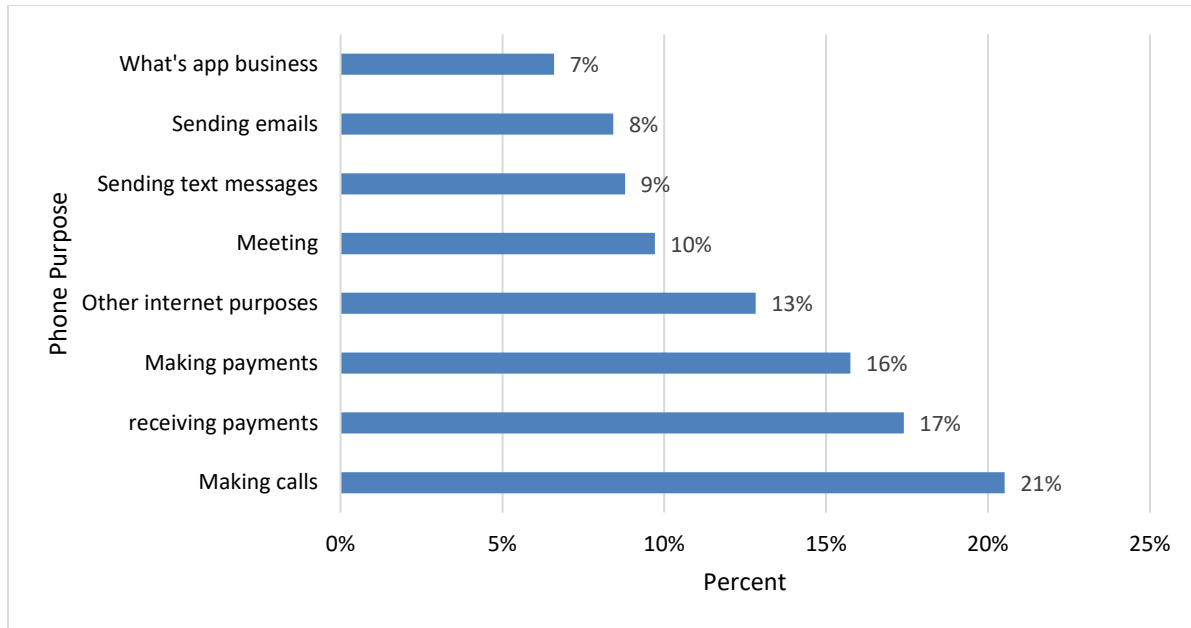
Among those who own a mobile phone, it was found that 79% have a smart phone



24b). If yes, is it a smart phone?

Purpose of the Phone.

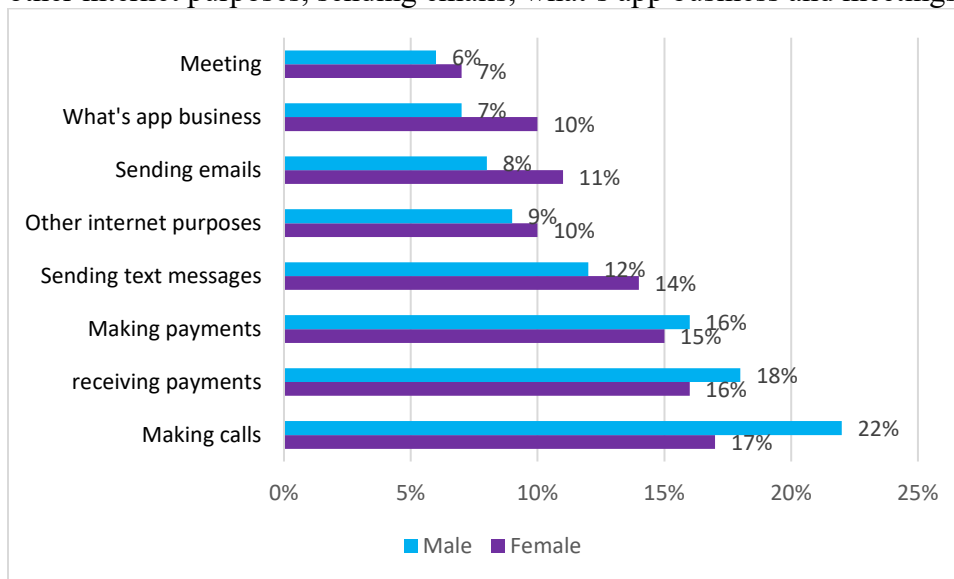
Among those who own phones it was found that majority of 21% are using them to make calls, 17% use them to receive calls, 16% use them to make payments while others uses are as shown below



24c) What do you use your phone for?

Phone Purpose by Gender

The study showed that majority of the males compared to female use the phone for making calls, receiving payments and making payments. On the other hand, majority of female compared to males use the phone to send text messages, other internet purposes, sending emails, what’s app business and meetings.

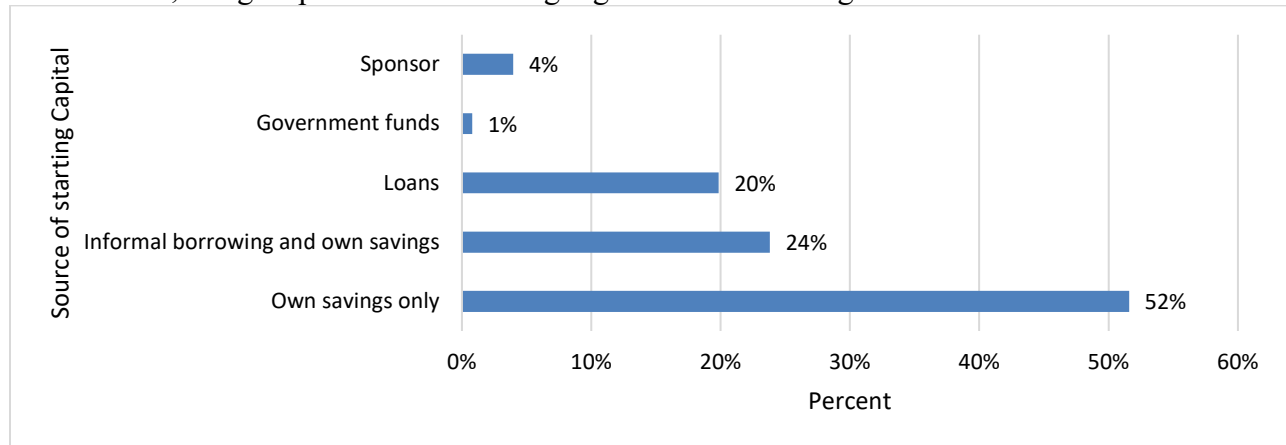


Phone Usage by Gender

BUSINESS

Source of Starting Capital.

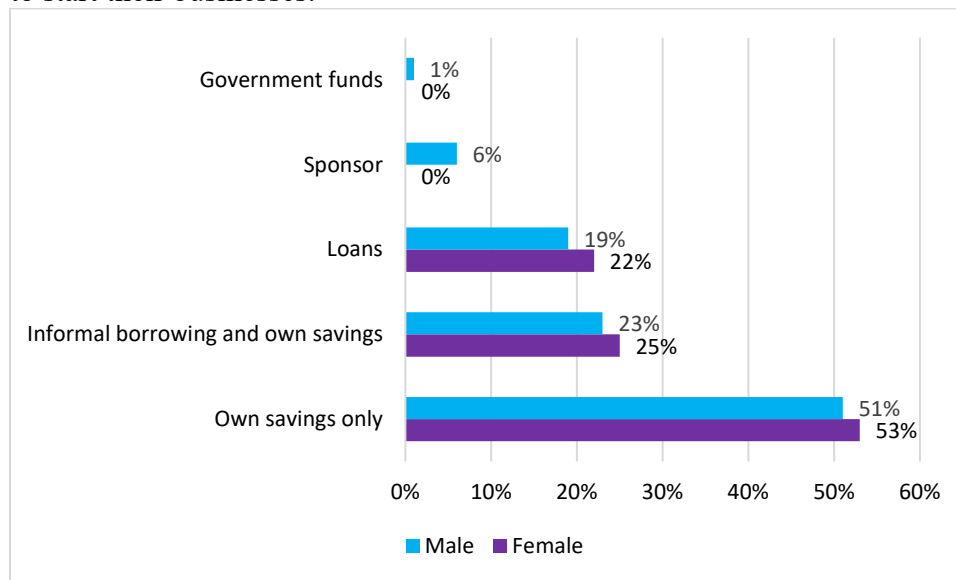
The study showed that majority of the entrepreneurs (52%) used their own savings to start their businesses, 24% used informal borrowing and own savings to start their businesses, 20% took formal loans, 4% got sponsors while 1 % got government funding as shown below



32. How did you finance the start of your business?

Source of Starting Capital by Gender.

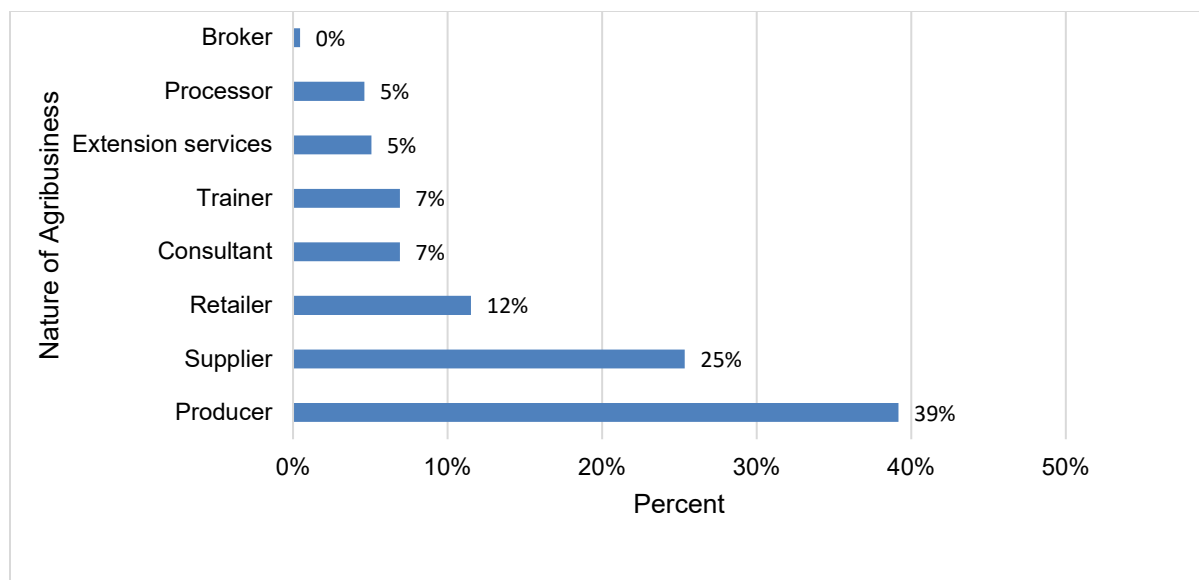
The study showed that more female than males used own savings, informal borrowing and formal loans to start their businesses while more males than female got sponsors and government funding to start their businesses.



32. How did you finance the start of your business?

Nature of the Agribusiness

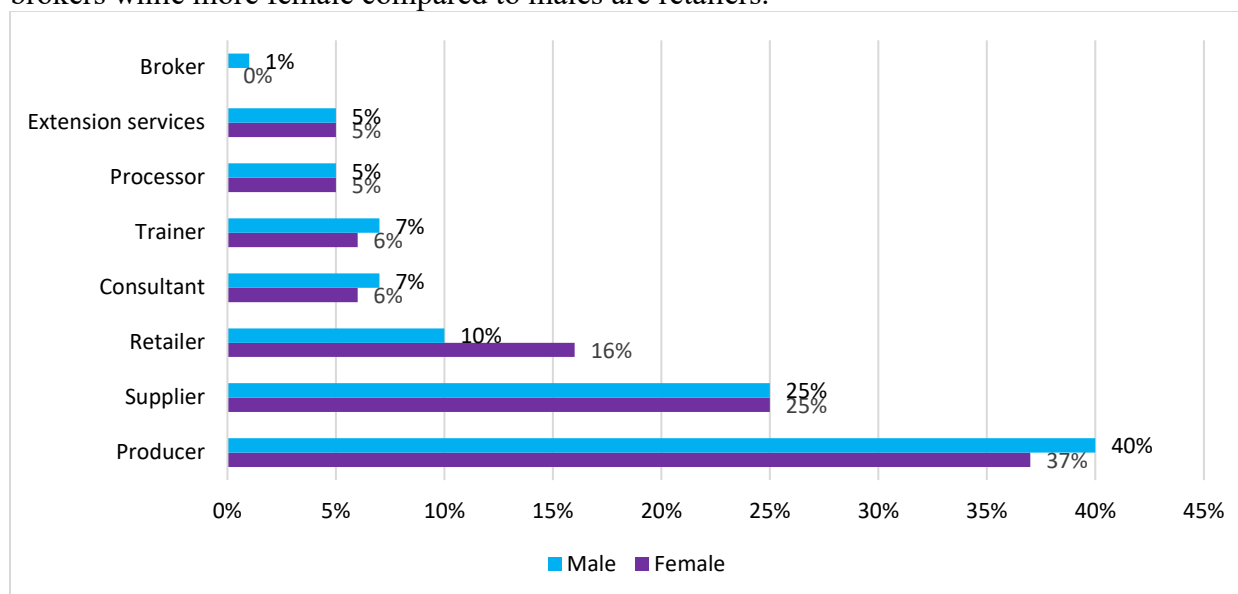
The study findings showed that majority of the businesses are producers (39%)



38. What is the nature of your agribusiness

Nature of the Agribusiness

The study showed that more males compared to female were producers, consultants, trainers and brokers while more female compared to males are retailers.



38. What is the nature of your agribusiness by gender

39. How much is your average monthly sales

The study showed that there was no significant change in average monthly sales at the end line.

	Average monthly sales	Std. Deviation	Mean Difference	Significance of Change at p=0.05 (t-test)
Baseline	19763	34015	569	P>0.05
End line	19194	24562		

Average Monthly Sale by gender

The study findings further showed that the average monthly sales by males were not significantly different from that of female at the baseline while at the end line, it was found that sales by males were significantly more than that of female.

Average Monthly Sale by gender at End line

	Average Monthly Sales in Shillings	
	Baseline	End line
Female	24045	12918
Male	38182	27012
Mean difference	-14136	-14093
Level of significance at p=0.05	0.173	0.034
Interpretation	Not Significant	Significant

Average Monthly Sale During COVID 19

The study at Baseline found that the average sales before COVID 19 significantly dropped by Ksh 14,741 during COVID 19

	Mean	Std. Deviation	Mean Difference	Significance of Change at p=0.05 (t-test)
Average monthly sales before COVID 19 (Ksh):	34786.71	57131.527	-14741.35	P<0.05
Average monthly sales during COVID 19 (Ksh):	20045.36	30045.399		

Sales by Gender During COVID 19

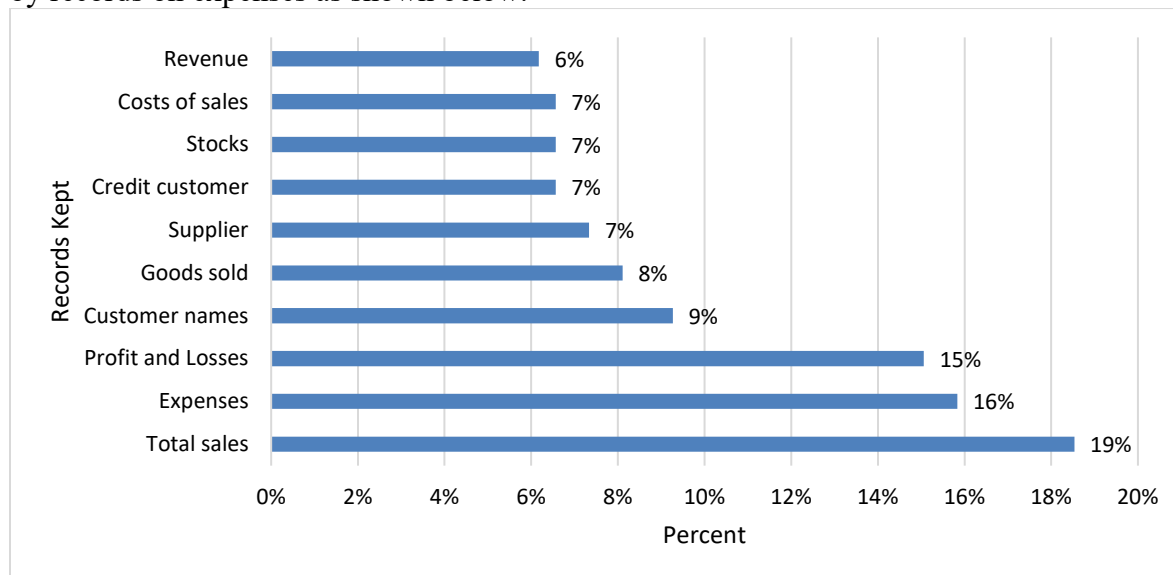
Further analysis by gender showed that male entrepreneurs had their average monthly sale going down significantly during COVID 19.

Gender		Mean	Mean Difference	t	Significance of the mean difference At p=0.05	Conclusion on Significance of the mean difference
Female	Average Monthly sales in shillings Before COVID 19	24045.45	- 7750.00	2.041	p=0.55	Not Significant
	Average Monthly sales in shillings during COVID 19	16295.45				

Male	Average Monthly sales in shillings Before COVID	38181.87	- 16820.02	3.11	p=0.03	Significant
	Average Monthly sales in shillings during COVID	21361.85				

Kind of Records to Keep.

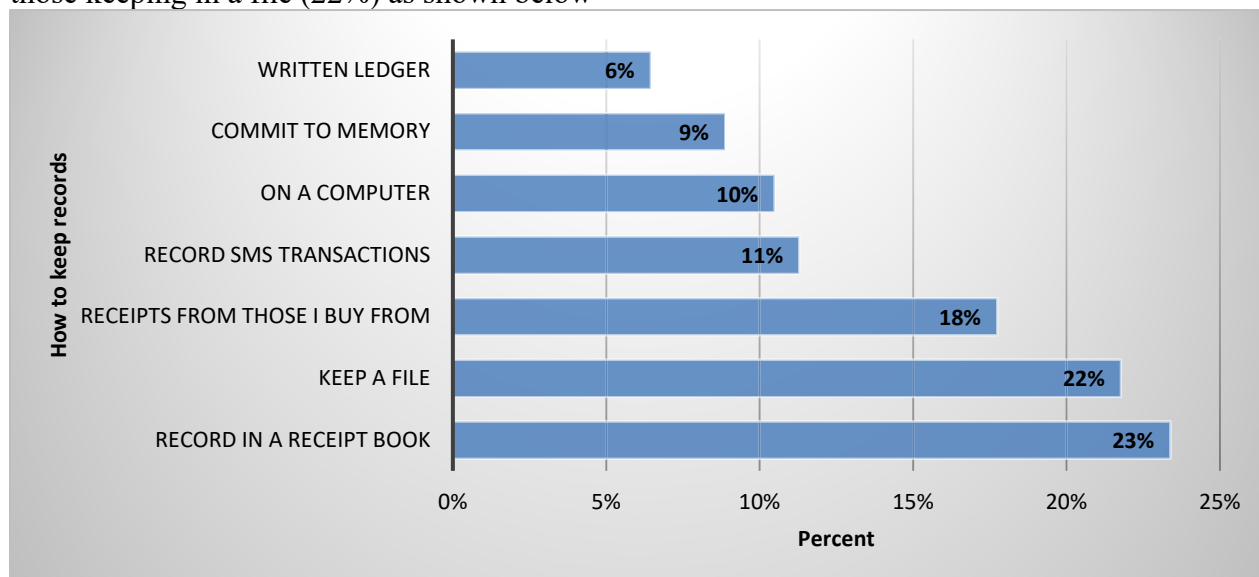
The study showed that majority of the entrepreneurs (19%) kept records for the total sales followed by records on expenses as shown below.



43). What kind of records do you keep?

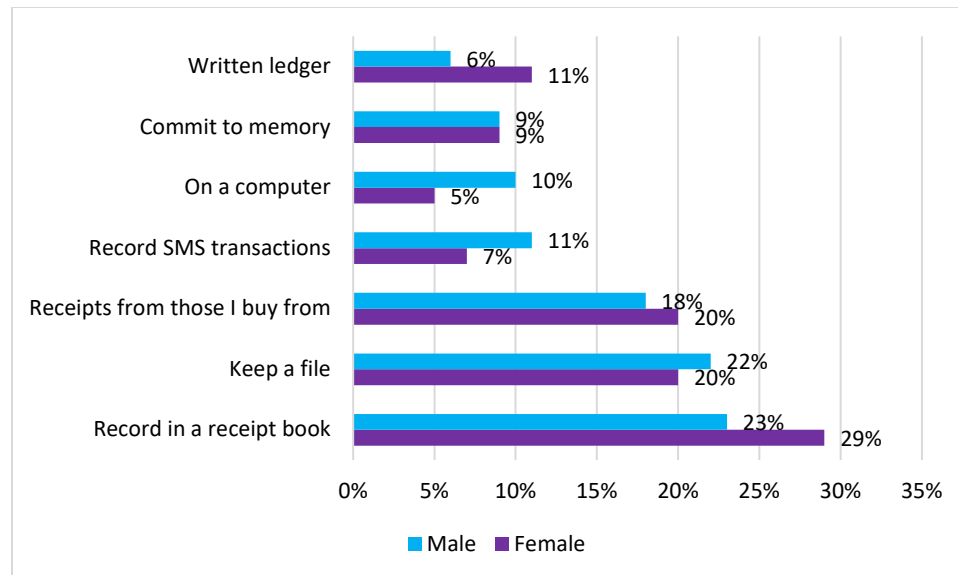
Methods of Record Keeping

The study showed that majority of the entrepreneurs keep record in a receipt book, followed by those keeping in a file (22%) as shown below



44. How do you keep these records? Methods of Record Keeping by Gender

The study showed that more female than male keep records in a receipt book and written ledger while more males than female keep records in a file, SMS transactions and on computer as shown below



44. How do you keep these records?

Challenges Faced before COVID 19.

Challenges	A little extent	A moderate extent	Great extent	Not a challenge
Absence of external funding	20.2%	36.9%	31.0%	11.9%
Poor Market access	37.2%	20.9%	11.6%	30.2%
Availability of raw materials	43.7%	31.0%	8.0%	17.2%
Poor Business Model	56.3%	21.3%	7.5%	15.0%
Lack of business-related knowledge	45.0%	18.8%	7.5%	28.8%
Lack of time due to household work/childcare	41.7%	13.1%	7.1%	38.1%
Lack of technical skills	44.7%	17.6%	7.1%	30.6%
Customer acquisition and retention	40.0%	21.3%	5.0%	33.8%
Compliance and regulatory issues	27.2%	19.8%	3.7%	49.4%
Lack of human resource	29.1%	19.8%	3.5%	47.7%

Challenges Faced before COVID 19 by Gender

Challenges	Male		Female	
	A moderate extent	Great extent	A moderate extent	Great extent
Availability of raw materials	26.2%	8.3%	12.5%	0.0%
Lack of technical skills	15.5%	6.0%	5.0%	2.5%
Poor Market access	13.1%	9.5%	17.5%	5.0%
Absence of external funding	27.4%	21.4%	20.0%	20.0%

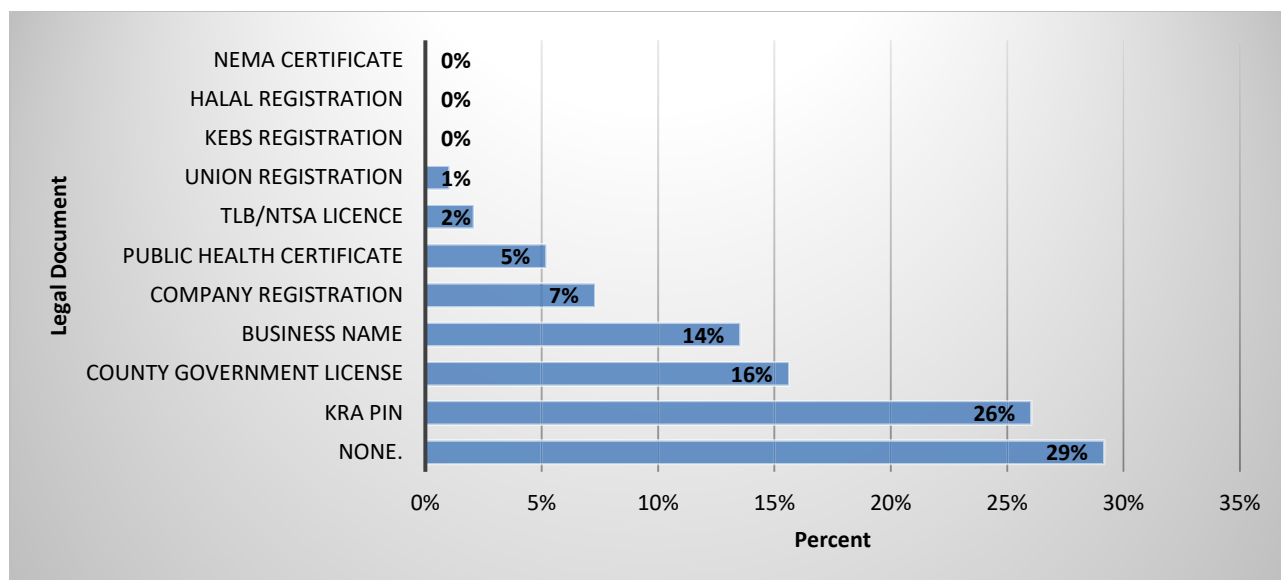
Poor Business Model	17.9%	7.1%	5.0%	0.0%
Lack of human resource	15.5%	3.6%	10.0%	0.0%
Lack of business-related knowledge	16.7%	7.1%	2.5%	0.0%
Compliance and regulatory issues	11.9%	3.6%	15.0%	0.0%
Customer acquisition and retention	13.1%	4.8%	15.0%	0.0%
Lack of time due to household work/childcare	9.5%	4.8%	7.5%	5.0%

Challenges Faced During COVID 19.

Challenges	A little extent	A moderate extent	Great extent	Not a challenge
Absence of external funding	13.1%	29.8%	52.4%	4.8%
Poor Market access	25.0%	32.1%	34.5%	8.3%
Availability of raw materials	24.7%	43.5%	25.9%	5.9%
Customer acquisition and retention	37.8%	31.7%	17.1%	13.4%
Compliance and regulatory issues	25.9%	14.8%	13.6%	45.7%
Poor Business Model	56.5%	25.9%	12.9%	4.7%
Lack of human resource	29.9%	19.5%	12.6%	37.9%
Lack of time due to household work/childcare	43.4%	18.1%	9.6%	28.9%
Lack of technical skills	56.5%	17.6%	8.2%	17.6%
Lack of business-related knowledge	57.5%	26.3%	3.8%	12.5%

Challenges Faced During COVID 19 by Gender.

Challenges	Male		Female	
	A moderate extent	Great extent	A moderate extent	Great extent
Availability of raw materials	51.7%	30.0%	24.0%	16.0%
Lack of technical skills	22.4%	6.9%	7.4%	11.1%
Poor Market access	35.6%	37.3%	24.0%	28.0%
Absence of external funding	29.3%	56.9%	30.8%	42.3%
Poor Business Model	26.7%	15.0%	24.0%	8.0%
Lack of human resource	21.3%	13.1%	15.4%	11.5%
Lack of business-related knowledge	30.4%	5.4%	16.7%	0.0%
Compliance and regulatory issues	17.9%	16.1%	8.0%	8.0%
Customer acquisition and retention	33.3%	21.1%	28.0%	8.0%
Lack of time due to household work/childcare	20.7%	10.3%	12.0%	8.0%



48. What legal documents does your agribusiness have?

7. Project Outputs

Some of the key outputs from the project included:

- Trained local trainers and mentors – The project had previously trained local based trainers/mentors with respect to the training modules and appropriate virtual mentorship practices. In addition, the trainers/mentors were brought to ICIPE Center to be trained on insect for feed production and management related activities.
- Formed incubation groups and leadership – The project formed county based groups of 50 male and youth Agripreneurs in the area of insect for feed. They were also engaged in identification of group leaders who were trained and mentored for purposes of building further capacity among the members.
- Screen houses – Five screen houses for producing insects for feed were constructed in each respective county, and select members along with local trainers were brought to ICIPE Center for training.
- Planned papers – The research team is working on pertinent research papers for dissemination including impact of COVID 19, gender mainstreaming. And knowledge transfer.
- Planned case studies – the research team is working on pertinent case studies for dissemination and use in future training materials.

8. Overall assessment and recommendations

On the overall, the project was able to introduce and create opportunities for male and female youth entrepreneur groups in the insect for feed product line. It was also able to create capacity for future growth. However, due to COVID 19 pandemic, the project was delayed and had to be restructured to:

1. Focus on training the leadership who would train their members.
2. Carry out virtual mentorship.
3. Refocus the assessment on the impact of COVID 19 since there was not adequate time to allow for an effective assessment of the other interventions

The research findings showed that:

1. The majority of the entrepreneurs (52%) used their own savings to start their businesses,
2. The number of entrepreneurs on each product significantly changed during COVID 19, i.e., entrepreneurs dealing with fish and insect increased during COVID 19 while those of poultry and pigs dropped significantly.
3. While, more male than female were in the group leadership position, there was no significant difference in the terms of participation in group decisions by gender nor by county.
4. The earning among group members averaged of 7,215 shillings per month but differences in earnings were not statistically significant between male and female entrepreneurs. However, the average sales before COVID 19 significantly dropped by Ksh 14,741 during COVID 19.

The project recommends that:

1. An assessment of the intervention be carried out in the future to assess the respective impacts.
2. Counties to consider enhancement of these respective projects to diversity the production of poultry, fish and pig feeds to minimize human competition between food and feed.