QUESTIONS(SURVEY)	CHOICES
What is the Farmer's sex?	1=Male 2=Female
What is the farmer's age?	
What's the Farmer's highest level of education?	0 = No Education 1 = Primary 2 = Secondary 3 = Technical/Vocational Training 4 = University 99 =Others…Specify
Do you farm Nile Tilapia?	1 =Yes 0 =No
Is Tilapia Farming you're your main or secondary activity?	1 = Main occupation 2 =Secondary occupation
If secondary occupation, what's your primary occupation?	1 = Aquaculture Farming 2 = Crop Farming 3 = Livestock Rearing 4 = Employed (Informal Sector) 5 = Employed (Formal Sector) 6 = Business 7 = Student 99 = Others…Specify
What year did you start fish farming activity?	
What year did you start the tilapia fish farming activity?	
How many cycles have you produced since 2019?	
How many people currently reside in the Farmer's household?	
How many of the people currently residing in the Farmer's household are aged: 0 -5 years old?	
5 - 18 years old?	
19 - 30 years old?	
31 - 60 years old?	
above 60 years old?	
Since January 2021, did you or any member of your household participate in a fish farming group?	1 = Yes 0 = No
What's the name of the group?	

What are the main services your household received from the fish farming group since January 2021?	1 = Inputs 2 = Financial (credit) 3 = Financial (grant) 4 = Fish seed (fingerlings) 5 = Training 6 = Pond/cage construction 7 = Market 8 = Information 9 = Fish Feed 100 = None 99 = Other (specify)
How often do you participate in farmer group/cluster meeting? [Read out options]	1 = Once a month 2 = Every few months 3 = Twice a year 99 = Other Specify
Did you complete at least one tilapia farming cycle in a fish pond/cage within the last one-year?	1 = Yes 0 = No
How long was your last production cycle in months?	
When do you expect to complete the current cycle	
How many Active Cages did you stock in the last one year?	
How many Active Ponds did you stock in the last one year?	
How much money (Ksh) did you pay for leasing the land / pond?	
What was the cost (in Ksh) of setting up your first pond?	
What was the cost (in Ksh) of setting up your last pond?	
What was the main source of labor for pond construction?	1 = Family Labor 2 = Hired labor 3 = Farmer group 99 = Other Specify
We would like to talk to you in detail about aquaculture management practices and input use for this tilapia ponds. We will talk about the last cycle that was stocked and completely harvested in 2024 at in these ponds	
Did you exchange or add water to these ponds	1 = Yes 0 = No
How often did you exchange or add water to these ponds	1 = Once or twice per month 2 = 3 _5 times in a month 3 = More 5 times in a month 4 = Rarely
Did you experience any problems related to water quality in these ponds?	1 = Yes 0 = No

What problems did you experience related to water quality in these ponds?	1=PH 2=Low dissolved oxygen 3 = Low water level 4 = Excess phytoplankton production 99 = Other (specify)
Specify other problem related to water quality that you experienced for these ponds	
What did you do to manage or control the problem(s) described for these ponds?	1 = Add water 2 = Apply lime 3 = Partially harvest fish to reduce fish density 100 = Nothing; 99 = Other specify
Specify other actions you undertook to manage or control the problem of these ponds.	
What type of fingerlings did you stock your cages with	1 = Mono-sex 100% 2 = Mono-sex – 90-95% reversed 3 = Mono-sex – 90-95% reversed and mixed with catfish 4 = Used mixed fingerlings 99 =Other Specify
What was/were the source of the fingerlings?	1 = Private Hatchery 2 = County Hatchery 3 = Own broodstock 4 = Neighbor 5 = NGO 99 = Other specify
Name of Hatchery	
County location of Hatchery	
Name /Phone number of hatcheries	
What is the average distance in KM from the homestead to the Cages	
What mode of transport do you use to access the cages	1= Motorbike/Boda-boda 2 = Public transport/Matatu 3 = Car 4 = Walk 5 = Boat 99 = Other specify
CAGE TENURE	
How many Cages are Individually owned	
How many Cages are Owned via Partnership	
How many Cages are Individually leased	
How many Cages are leased via Partnership	
How much money (Ksh) did you pay for the construction of the first cage?	

How much money (Ksh) did you pay for the construction of the latest cage?	
If group owned/leased follow up with by how many people?	
What was source of money to set up the cage(s)?	1 = Own savings 2 = Family 3 = Credit 4 = Group contribution 99 = Other specify
DIGITAL SERVICES	
In the last 2 years (2023 and 2024), did you receive information or advice on the following	
Did you receive or seek advice or information regarding Aquaculture? From Production, climate-related, market, financial, to health and nutrition	1 = Yes 0 = No
What was the source of information received?	1 = Social media channels (Facebook, TikTok, WhatsApp, YouTube) 2 = Mobile phone apps 3 = TV 4 = Radio 5 = SMS 6 = County government extension worker 7 = Input supplier e.g. feed manufacturer, hatchery 8 = Friends/family/neighbor 9 = University/research facility 99 = Other…specify
RISKS	
Since 2019, what were the main sources of production risk?	1 = Droughts 2 = Floods/Excess rains/Heavy rains (ponds); 3 = Upwelling (cages); 4 = Prolonged rains; 5 = Use of undersized fingerlings 6 = Uncertified fish fingerlings 7 = Uncertified fish feeds 8 = Unavailability of feeds (Supply chain disruption) 9 = Increased prices of fish feeds 10 = Increased prices of other inputs (nets, liners etc.) 11 = Predators (e.g. monitor lizards, birds) 12 = Theft 13 = Fingerlings infected by diseases 14 = Fish death due to diseases 15 = Lack of cold chain infrastructure for storage and transportation

	16 = Lack labor force 17 = Poor water quality 18 = Over (density) stocking fingerlings 19 = Winds and waves 20 = Fish escape from cages or ponds 21 = Vandalized 100 = None 99 = Other… Specify1 98 = Others… Specify2 97 = Others… Specify3
In which year/month did you last experience ${priskid}	
Since 2019, how many times has ${priskid} occurred?	
How could you rate the impact of ${priskid}?	1 = No impact /very low impact 2 = Low Impact 3 = Medium impact 4 = High Impact 5 = Very high/Severe Impact
What are the main consequences of the outcomes associated with ${priskid} (Ranking from the most important to the least)	1 = Reduced/Low yields 2 = Poor quality yields 3 = Early harvest 4 = Prolonged harvest (took longer to harvest) 5 = Reduced income/earnings 99 = Other specify
What is the likelihood of ${priskid} occurring again in future	1= Never/unlikely 2 = Rarely (2 in 5 years); 3 = Moderately (3 in 5 years) 4 =Often (4 in 5 years); 5 = Very often (5 of 5 years)
On a scale of 1 to 5, where 1 is very able, and 5 is not able at all, are you able to control ${priskid} (see qn 5) from happening?	1=1 is very able, 2 = 2 3 =3 4 =4 5 =5 is not able at all
Explain your answer (what factor influenced your decision to control/not control for risk?)	
Did you do anything to reduce the impact of ${priskid}	1 = Yes 0 = No
If no, how much money in Ksh did you lose as a result of not taking any measures?	
If no to 10, why didn’t you do something	1 = I don’t have the knowledge 2 = I don’t have the money 3 = It is not a priority for me 4 = I didn't have access to the extra labor needed. 99 = Other specify

If yes, when did you do something?	1= Before 2= After
If yes, what did you do?	1= Diversification (engaged in crops and livestock rearing to derisk); 2 = Purchased heavier/older juveniles/fish fingerlings. 3 = Installed dikes to mitigate flooding; 4 = Changed fish fingerling sources 5 = Used certified fish feeds; 6 = Constructed cages in approved areas within the lake; 7 = Hired security service; 8 = Used alternative/cottage/homemade feeds (e.g. wheat brans, rice brans etc.) 9 = Early harvesting 10 = Late/delayed harvesting 11 = Reduced stocking density 12 = Treated Pond before stocking 13 = Purchased good feed quality 14 = Change water regularly 15 = Improve hygiene 16 = Use nets/bird traps 17 = Used salt to treat fungi/diseases 18 = Used chemicals to treat diseases 19 = Patrolling cages/pond 20 = Locking cages/pond 21 = Hiring guards 22 = Installed CCTV and lights 23 =Migrated cages to new beach/location 24 = Establish Bulking Unit/Nursery 25 = Use of local/alternative material to fix nets and liners 26 = Sought alternative water source e.g. borehole, pumping, storage tanks, water reservoir 27 = Construct drainage system 28 = Value addition 29 = Community sensitizations 100 = None; 99 = Others… Specify
If yes what was the average cost in Ksh of the measures you took?	
PRISK NAMES	
From the risks above, which 3 are the most problematic to you (starting from the worst)	

Why do you choose the risks in 1 as the most problematic [___] Use the codes for main consequences (no 6)	1 = Reduced/Low yields 2 = Poor quality yields 3 = Early harvest 4 = Prolonged harvest (took longer to harvest) 5 =Reduced income/earnings 99 = Other specify
How did you get to know that the risk in 1 is the most problematic	1 = I have experienced it before 2 = I saw my neighbor experience it 3 = My neighbor told me it is the worst 4 = We were trained about the risk 99 = Others… Specify
Since 2019, what are the main sources of financial risk?	1 = High interest rate 2 =Lack of credit/loan/input loan 3 =Lack of own capital 4 =Fish price variability 100 =None 99 = Other… Specify1 98 = Others… Specify2 97 = Others… Specify3
FINANCIAL RISK	
In which year/month did you last experience${friskid}	
Since 2019, how many times has ${friskid} occurred?	
How could you rate the impact of ${friskid}?	1 = No impact /very low impact 2 = Low Impact 3 = Medium impact 4 = High Impact 5 = Very high/Severe Impact
What are the main consequences of the outcomes associated with ${friskid} (Ranking from the most important to the least)	1 = Reduced income/earnings 2 = Low yields 3 = Used cottage/homemade inputs (e.g. Omena, ochonga, rice/wheat bran etc.) 4 = Low quality of harvested fish 5 = Early harvesting 6 = Late/delayed harvesting 7 = Foregoing Pond/cage stocking 8 = Sell via Middlemen and contractors 99 = Other specify
What is the likelihood of ${friskid} occurring again in future	1= Never/unlikely 2 = Rarely (2 in 5 years); 3 = Moderately (3 in 5 years) 4 = Often (4 in 5 years); 5 = Very often (5 of 5 years)
On a scale of 1 to 5, where 1 is very able, and 5 is not able at all, are you able to control ${friskid} (see qn 5) from happening?	1 = 1 is very able, 2 = 2 3 = 3 4 = 4

	5 = 5 is not able at all
Explain your answer (what factor influenced your decision to control/not control for risk?)	
Did you do anything to reduce the impact of ${friskid}	1= Yes 0 = No
If no, how much money in Ksh did you lose as a result of not taking any measures?	
If no to 10, why didn't you do something	1 = Lack of alternative sources of income 2 = Lack of credit 3 =Lack of collateral 99 = Other specify
If yes, when did you do something?	1= Before 2 = After
If Yes, what did you do?	1= Reduced number fingerlings stocked 2 = Reduced number of cages/ponds stocked 3 = Selling other assets 4 = Borrowing from friends 5 = Engaging in alternative sources on income generation 6 = Changed fish variety 7 = Savings, capital reinvestiment, SACCO 8 =Seek low interest loans 9 = Used cottage/homemade inputs (e.g. Omena, ochonga, rice/wheat bran etc.) 10 = Early harvesting 11 = Late/delayed harvesting 99 = Others… Specify
If yes what was the average cost in Ksh of the measures you took?	
From the risks above, which 3 are the most problematic to you (starting from the worst)	
Why do you choose the risks in 1 as the most problematic [___] Use the codes for main consequences (no 6)	1 = Reduced income/earnings 2 =Low yields 3 = Used cottage/homemade inputs (e.g. Omena, ochonga, rice/wheat bran etc.) 4 = Low quality of harvested fish 5 = Early harvesting 6 = Late/delayed harvesting 7 = Foregoing Pond/cage stocking 8 = Sell via Middlemen and contractors 99 = Other specify
How did you get to know that the risk in 1 is the most problematic	1 = I have experienced it before 2 = I saw my neighbor experience it 3 = My neighbor told me it is the worst 4 = We were trained about the risk 99 = Others… Specify

Since 2019, what are the main sources of Market risk?	1= Fish prices variability 2 =Exploitation from middlemen 3 =Spoilage of harvested fish 100 =None 99 = Other… Specify1 98 = Others… Specify2 97 = Others… Specify3
MARKET RISK	
In which year/month did you last experience${mriskid}	
Since 2019, how many times has ${mriskid} occurred?	
How could you rate the impact of ${mriskid}?	1 = No impact /very low impact 2 = Low Impact 3 = Medium impact 4 = High Impact 5 = Very high/Severe Impact
What are the main consequences of the outcomes associated with ${mriskid} (Ranking from the most important to the least)	1= Harvested Fish got spoilt/post-harvest loss 2 =Never sold 3 = Reduced use of commercial feeds 4 = Early harvesting 5 = Late/delayed harvesting 6 = Was unable to repay my loan 7 = Use of cottage feeds/home 99 = Other specify
What is the likelihood of ${mriskid} occurring again in future	1= Never/unlikely 2 = Rarely (2 in 5 years); 3 = Moderately (3 in 5 years) 4 = Often (4 in 5 years); 5 = Very often (5 of 5 years)
On a scale of 1 to 5, where 1 is very able, and 5 is not able at all, are you able to control ${mriskid} (see qn 5) from happening?	1= 1 is very able 2 = 2 3 = 3 4 = 4 5 = 5 is not able at all
Explain your answer (what factor influenced your decision to control/not control for risk?)	
Did you do anything to reduce the impact of ${mriskid}	1=Yes 0 = No
If no, how much money in Ksh did you lose as a result of not taking any measures?	
If no to 10, why didn't you do something	1 = Middlemen control prices 2 = I produce small quantities; depend on the market 3 = The government offered subsidies 99 =Other specify
If Yes, when did you do something?	1 = Before 2 = After

If Yes, what did you do ?	1 = Delayed harvesting of fish 2 = Used traditional inputs 3 = Restrained from taking a loan 4 = Reduced amounts of commercial fish feed used 5 = Value addition 6 = Used cold storage/fridge 7 = Sell via Middlemen and contractors 8 = Partial Harvesting/Direct Sales 99 = Other specify
If yes what was the average cost in Ksh of the measures you took?	
Market Risk Names	
From the risks above, which 3 are the most problematic to you (starting from the worst)	
Why do you choose the risks in 1 as the most problematic [___] Use the codes for main consequences (no 6)	1 = Harvested Fish got spoilt/post-harvest loss 2 = Never sold 3 = Reduced use of commercial feeds 4 = Early harvesting 5 = Late/delayed harvesting 6 = Was unable to repay my loan 7 = Use of cottage feeds/home 99 = Other specify
How did you get to know that the risk in 1 is the most problematic	1 =I have experienced it before 2 = I saw my neighbor experience it 3 = My neighbor told me it is the worst 4 = We were trained about the risk 99 = Others… Specify
Since 2019, what are the main sources of Institutional risk?	1= Government aid e.g. fish feeds subsidies 2 =High municipal fees (to set up cage, sell fish etc.) 3 = Fish price variability due to cheap imported fish from Uganda, TZ, China etc. 4 = Cage tenure security variability 5 = Variability in BMU associated costs and laws (unfavorable) 6 = Bribes/corruption (In regards to fish production, including accessing market) 7 = Changes in fish farmer group membership (unfavorable e.g. dissolving group etc.) 8 = Unfavorable Changes in fish farmer group management 100 = None 99 = Other… Specify1 98 = Others… Specify2 97 = Others… Specify3

INSTITUTIONAL RISK	
In which year/month did you last experience${iriskid}	
Since 2019, how many times has ${iriskid} occurred?	
How could you rate the impact of ${iriskid}?	1= No impact /very low impact 2 = Low Impact 3 = Medium impact 4 = High Impact 5 = Very high/Severe Impact
What are the main consequences of the outcomes associated with ${iriskid} (Ranking from the most important to the least)	1 = Market Prices were extremely low 2 = Production cost went high 3 = I increased my number of cages/ponds 4 = I lost my cage permit 5 = My income reduced remarkably 6 = My income increased drastically 99 = Other specify
What is the likelihood of ${iriskid} occurring again in future	1= Never/unlikely 2 = Rarely (2 in 5 years); 3 = Moderately (3 in 5 years) 4 = Often (4 in 5 years); 5 = Very often (5 of 5 years)
On a scale of 1 to 5, where 1 is very able, and 5 is not able at all, are you able to control ${iriskid} (see qn 5) from happening?	1= 1 is very able, 2 = 2 3 =3 4 =4 5= 5 is not able at all
Explain your answer (what factor influenced your decision to control/not control for risk?	
Did you do anything to reduce the impact of ${iriskid}	1 = Yes 0 = No
If no, how much money in Ksh did you lose as a result of not taking any measures?	
If no to 10, why didn't you do something	1= It is out of my control 99= Other specify
If yes, when did you do something?	1= Before 2 = After
If yes, what did you do?	1 = Never sold my produce 2 = Delayed fish harvesting 3 = Sold fish at a loss 4 = Joined a farmers group 5 = Changed feed type used 6 = Reduced amount of commercial fish feeds used 7 = Value addition 99 = Other specify
If yes what was the average cost in Ksh of the measures you took?	
Institutional risk names	

From the risks above, which 3 are the most problematic to you (starting from the worst)	
Why do you choose the risks in 1 as the most problematic [___] Use the codes for main consequences (no 6)	1 = Market Prices were extremely low 2 =Production cost went high 3 = I increased my number of cages/ponds 4 = I lost my cage permit 5 = My income reduced remarkably 6 = My income increased drastically 99 =Other specify
How did you get to know that the risk in 1 is the most problematic	1 = I have experienced it before 2 = I saw my neighbor experience it 3 = My neighbor told me it is the worst 4 = We were trained about the risk 99 = Others… Specify
Since 2019, what are the main sources of Personal risk?	1= Sickness (excluding chronic sickness) 2 = Traffic accident 3 = Divorce 4 = Work related accidents 5 = Death of business partner 100 = None 99 = Other… Specify1 98 = Others… Specify2 97 = Others… Specify3
PERSONAL RISK	
In which year/month did you last experience${periskid}	
Since 2019, how many times has ${periskid} occurred?	
How could you rate the impact of ${periskid}?	1= No impact /very low impact 2= Low Impact 3 = Medium impact 4 = High Impact 5 = Very high/Severe Impact
What are the main consequences of the outcomes associated with ${periskid} (Ranking from the most important to the least)	1 = Reduced production (number of cages, no of ponds) 2 = Reduced incomes 3 = Difficulty paying for debt 4 = Didn't stock the ponds 99 = Other specify
What is the likelihood of ${periskid} occurring again in future	1 = Never/unlikely 2 = Rarely (2 in 5 years); 3 = Moderately (3 in 5 years) 4 = Often (4 in 5 years); 5 = Very often (5 of 5 years)
On a scale of 1 to 5, where 1 is very able, and 5 is not able at all, are you able to control ${periskid} (see qn 5) from happening?	1 = 1 is very able, 2= 2 3 = 3 4 = 4 5 = 5 is not able at all

Explain your answer (what factor influenced your decision to control/not control for risk?	
Did you do anything to reduce the impact of ${periskid}	1= Yes 0 = No
If no, how much money in Ksh did you lose as a result of not taking any measures?	
If no to 10, why didn't you do something	1 = It is God's doing 2 = I don't have the money 3 = I don't have the knowledge 4 = It is not a priority for me 99 = Other specify
If yes, when did you do something?	1 = Before 2 = After
If yes, what did you do?	1= Healthy eating 2 = Frequent exercising 3 =Reduced number of working hours 4 =Took a loan 5 =Took Insurance cover 6 = Seek medical attention 99 = Other specify
If yes what was the average cost in Ksh of the measures you took?	
PERISK NAMES	
From the risks above, which 3 are the most problematic to you (starting from the worst)	
Why do you choose the risks in 1 as the most problematic [___] Use the codes for main consequences (no 6)	1 = Reduced production (number of cages, no of ponds) 2 = Reduced incomes 3 = Difficulty paying for debt 4 = Didn't stock the ponds 99 = Other specify
How did you get to know that the risk in 1 is the most problematic	1 = I have experienced it before 2 =I saw my neighbor experience it 3 = My neighbor told me it is the worst 4 = We were trained about the risk 99 = Others… Specify