



Baseline characterization of aquaculture systems in Kwara State Nigeria



RESEARCH
PROGRAM ON
Fish

Hatchery Surveys

Section A: Hatchery Identification & Roster

Hatcheries' Characterization Study in Kwara - Nigeria

▼ INTRODUCTION AND CONSENT

[Before starting the interview, read aloud the following paragraph and ensure that the respondents understand before asking for their consent.]

Good morning/afternoon. In collaboration with WorldFish, we are conducting a study to understand how fish seed is produced and disseminated to different actors including traders and farmers. You were randomly selected for this. Your name will not appear in any data that is made publicly available. The information you provide will be used purely for research purposes. Your participation in the study is voluntary and you do not have to participate if you don't want to. You may withdraw from the study at any time and if there are questions that you would prefer not to answer then we respect your right not to answer them. You may ask questions at any time and if after the survey/interview you have any questions, you can contact Ajibola Olaniyi from Worldfish. This interview will take about 1 hour.

Do you accept to provide information?

- Yes
 No

- Take few minutes to explain the purpose of the survey and ask for consent from respondent

▼ HATCHERY IDENTIFICATION INFORMATION

Time interview started

Country

Nigeria

State

Kwara

Nassarawa

LGA

code

Village

code

- Record the identification information of the Hatchery

Unique identification number

code

Code of the enumerator

- dummy1
- dummy2
- dummy3
- dummy4
- dummy5
- dummy6
- dummy7
- dummy8
- dummy9
- dummy10

Name of the respondent

- Identify yourself and the name of the respondent

Sex of the respondent

- Female
- male

What is your age? (Years)

- 16-20 years old
- 21-29 years old
- 30-35 years old
- 36-60 years old
- 60 years and above

What is your role at the hatchery?

- Hatchery owner
- Hatchery manager
- Other, specify

How many years have you been working in fish seed production business?

- Sex
- Age
- Role
- Experience

What species of fish seed do you produce?

- Catfish
- Tilapia
- Other, specify

Specify other fish seed

Telephone or mobile number

Are you a member of a cluster

- Yes
- No

What is the name of the cluster?

- Species of fish seed produced.
- Contact information
- Cluster membership

What are the main challenges you face in your daily fish seed multiplication or nursing business?

- Lack of enough brood fish
- Lack of market for tilapia
- Low price for tilapia fish seed
- Low production capacity
- Lack of credit
- Limited skills and technical knowhow in fish seed production
- High incidence of diseases
- High competition in the market
- Poor quality of feed
- Lack of feed and fertilizer
- Limited supply of water
- Poor water quality
- Limited skilled labour
- Labour burdens (unavailability of labour of any type)
- Other, specify

Specify other challenges


- Challenges faced in fish seed business
 - *Select all that applies*

Section B: Brood Stock Management

Type of fish seed


- Catfish
- Tilapia
- Other, specify

What month and year did you start fish seed multiplication business for Catfish? 1

yyyy-mm 

Where did you obtain your original broodstock from?

Which year did you obtain the original broodstock?

yyyy 

Record the details for each type of fish seed produced.

- Year of start
- Source of brood stock
- Year of obtaining original brood stock

Have you ever replaced your broodstock for Catfish since you obtained the original broodstock?

- Yes
- No

Do you produce your own broodstock for Catfish?

- Yes
- No

How many spawn cycles (numbers) for brood stock production per year?

Do you exchange brood stock with other hatcheries?

- Yes
- No

What are the main reasons why you exchange brood stock with other hatcheries?- select all that apply

- To minimize inbreeding
- To ensure diversity
- To satisfy customer demand
- Other (specify)

How long (days) was the nursing period for Catfish from hatching to selling?

- Brood stock replacement
- Production of own brood stock
- Brood stock exchange.
- Main reasons of exchange
- Nursing period

Do you maintain separate ponds/facilities for different broodstock?

- separate
- mix
- both

How do you separate ponds/facilities for broodstock?

- different sex
- different age
- different strain
- Other (specify)

Are batches of seed maintained separately up to the time of sale (e.g. by date of spawning and/or broodstock used)?

- Yes
- No

Did you receive any training about brood fish management during the past two years?

- Yes
- No

- Separation of brood stock
- Separation criteria
- Batch separation
- Training on brood fish management

Section C: Biosecurity Measures

Are there hand washing facilities at the entrance of the hatchery

- Yes
- No

Is there a footbath at the entrance of the hatchery

- Yes
- No

Do you apply quarantine when receiving/purchasing brood fish?

- Yes
- No

Do you check for parasite on brood fish?

- Yes
- No

Which of the following facilities do you currently have at your hatchery?

- Brood fish pond
- Hatching and spawning tanks
- Nursing pond

- Handwashing facilities
- Foot bath at entrance
- Quarantine of new brood fish
- Parasite check
- Facilities

Do you have any equipment for measuring water quality at the hatchery?

- Yes
- No

What parameters do you look at when measuring water quality for your hatchery?

Select all mentioned. Do not prompt the respondent but record as mentioned.

- temperature
- dissolved oxygen levels
- pH
- ammonia and nitrite levels
- Other (specify)

What actions do you take if water quality is detected to be poor?

Select all mentioned. Do not prompt the respondent but record as mentioned.

- water exchange
- use oxygen tablets
- use water treatment chemicals
- water treatment using sand filter
- Other (specify)

- Water quality
- Equipment
- Parameters
- Actions if poor water quality is detected

Do you disinfect tanks and accessory equipment such as pumps, filters, pipes, and trays?

Yes

No

How often do you disinfect tanks and accessory equipment such as pumps, filters, pipes, and trays?

After every harvest

After two harvests

After three harvests

After four harvests

After five harvests

After more than five harvests

- Tanks and accessory disinfection
- Frequency of disinfection

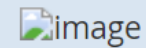
Did you experience any abnormal mortality during last 12 months?

- Yes
- No

What types of symptom did you observe?

Show the picture to respondent and ask him/her to identify the symptom

- Lethargy
- Loss of balance
- Loss of appetite
- Swimming at the surface
- Erratic swirling
- Fish gasping air at the surface



- Abnormal mortality
- Symptoms (show the pictures)

- Eye opacification
- Eye exophthalmia/ Popey
- Eye endophthalmia/eye shrinkage
- Skin erosions
- Skin discoloration
- Open wounds
- Abdominal distension/swelling
- Scale protrusion/detachment



- Symptoms (show the pictures)

If you observed abnormal mortality, what do you think caused the abnormal mortality of fries/fingerlings?

Select all mentioned. Do not prompt the respondent but record as mentioned.

- Handling stress
- Grading stress
- Treatment stress (chemical, antibiotics, others)
- Sudden heavy rainfall
- Flooding
- Change in salinity
- Sudden temperature fluctuation
- Long exposure to abnormal water temperature (too cold, too hot)
- Water quality stress (due to exogenous pollution)
- Water quality stress (due to high level of ammonia, nitrite, low oxygen, pH - other factors)
- Bacterial disease
- Viral disease
- Parasitic disease
- Introduced new species
- After introducing new stock
- Affected by neighbouring pond/tank
- Other diseases
- No suspected causes
- Other (specify)

- Causes of abnormal mortality.
 - *Select all that applies*

What action did you take in response to the abnormal mortality

- Harvest all the fries/fingerlings
- Drain and dry the pond
- Apply chemical, antibiotic, probiotic
- Use aqua products for water treatment
- Salt
- No intervention (do nothing)
- Other (specify)

Specify other

How do you manage the dead fries/fingerlings?

- remove and burry
- leave in the pond
- remove and dispose elsewhere
- Other (specify)

Specify other

- Responses to abnormal mortality
 - *Select all that applies*
- Management of dead fries/fingerlings

How do you manage the water after disease attack

- exchange water
- water treatment using chemicals
- no action
- Other (specify)

Specify other

- Management of water after disease attack

Section D: Fry Production

Now we will talk about the amount of fish seed that you sold during the last 12 months

Type of fish

- Catfish
- Tilapia
- Other, specify

» Information on fish seed sold

1

What was/were the source(s) of the broodstock/fish for Catfish?

How many of brood fish (numbers) did you have for producing seed of Catfish in the last 12 months?

Weight per broodfish (g)

- Record the production details
- Source of brood stock
- Number of brood stock
- Weight in grammes

Did you buy the broodfish of Catfish?

Yes

No

How many hatching cycles of Catfish did you have in the last 12 months?

What was the quantity of fry of Catfish produced in the last 12 months

How long (days) was the nursing period for Catfish from hatching to selling?

What quantity of fries of Catfish was sold in the last 12 months

Weight (g) per piece of fries of Catfish sold
[if no records, let the respondent provide an estimate]

At what price/ piece did you sell fish seed of Catfish, on average

(Naira)

- Number of hatching cycles
- Days of nursing
- Quantity of fries produced
- Weight per piece
- Price per piece

Take note of the units of measurement!

Who bought the fish seed of the Catfish?

- Grow-out farmer
- Fellow hatchery
- Nursery operator
- Fish seed trader / agent
- NGO
- Government
- Farmer group / cooperative
- Other (specify)

What was the mode of payment for the seed of Catfish that you sold?

- cash
- credit
- both cash and credit

- Customers
- mode of payment

Section E: Fertilizer Use and Cost

Did you apply any chemical fertilizer for fish seed production at your hatchery in the last 12 months?

- Yes
 No

What types of fertilizer or manure did you apply?

- Diammonium phosphate (DAP)
 Triammonium phosphate (TSP)
 Urea
 Calcium ammonium nitrate (CAN)
 Lime
 Muriate of potash
 Gypsum
 Poultry manure
 Other manure
 Other (specify)

- Fertiliser use
- Type of fertiliser
 - *Select all that apply*

- Triammonium phosphate (TSP)
- Urea
- Calcium ammonium nitrate (CAN)
- Lime
- Muriate of potash
- Gypsum
- Poultry manure
- Other manure
- Other (specify)

▼ » **Fertilizer applied**

1
What amount (in Kg) of Urea did you apply for fish seed production during the past 12 months?

What was the TOTAL COST of the Urea that you applied for fish seed production during the past 12 months?

Naira

Record

- the quantity applied
- Total cost for the past 12 months

Section F: Chemicals for Water Treatment & Other Uses

Did you apply any chemicals for your fish seed production at your hatchery during the last 12 months?

- Yes
 No

What types of chemicals did you apply?

- Oxygen tablets
 Antibiotics
 Hormones for sex-reversal e.t.c
 Probiotics
 Ethanol
 Water treatment chemicals
 Herbicides
 Pesticides
 Chemicals for cleaning the equipment
 Other (specify)

- Chemical use
- Type of Chemical
 - *Select all that apply*

- Herbicides
- Pesticides
- Chemicals for cleaning the equipment
- Other (specify)

▼ » **Information on fish seed sold**

1

What amount (in Liters) of Chemicals for cleaning the equipment did you apply for fish seed production during the past 12 months?

What was the TOTAL COST of the Chemicals for cleaning the equipment that you applied for fish seed production during the past 12 months?

Naira

Record

- the quantity applied
- Total cost for the past 12 months

Section G: Feed Application & Cost

Feed for brood fish

What types of feed did you apply for brood fish at your hatchery in the last 12 months?

- | | |
|--|---|
| <input type="checkbox"/> Formulated commercial feed (floating) 2mm | <input type="checkbox"/> Farm-made feed (floating) 3mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 3mm | <input type="checkbox"/> Farm-made feed (floating) 4mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 4mm | <input type="checkbox"/> Farm-made feed (floating) 5mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 5mm | <input type="checkbox"/> Farm-made feed (floating) 6mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 6mm | <input type="checkbox"/> Farm-made feed (sinking) 2mm |
| <input type="checkbox"/> Formulated commercial feed (sinking) 2mm | <input type="checkbox"/> Farm-made feed (sinking) 3mm |
| <input type="checkbox"/> Formulated commercial feed (sinking) 3mm | <input type="checkbox"/> Farm-made feed (sinking) 4mm |
| <input type="checkbox"/> Formulated commercial feed (sinking) 4mm | <input type="checkbox"/> Farm-made feed (sinking) 5mm |
| <input type="checkbox"/> Formulated commercial feed (sinking) 5mm | <input type="checkbox"/> Farm-made feed (sinking) 6mm |
| <input type="checkbox"/> Formulated commercial feed (sinking) 6mm | <input checked="" type="checkbox"/> Household / kitchen waste |
| <input type="checkbox"/> Farm-made feed (floating) 2mm | <input type="checkbox"/> Mixed commercial and farm made feed |
| | <input type="checkbox"/> Other (specify) |
| | <input type="checkbox"/> None |

Feed use – brood fish

- Select all that applies

Mixed commercial and farm made feed

Other (specify)

None

▼ » **Feed applied for brood fish**

1

How much Mixed commercial and farm made feed did you apply for fish seed production (kg)?

% of protein in Mixed commercial and farm made feed

Did you buy the Mixed commercial and farm made feed

Yes

No

Total cost of Mixed commercial and farm made feed feed applied (Naira)

Record

- the quantity applied
- % of protein
- Total cost for the past 12 months

Feed for one cycle of fingerlings

What type(s) of feed did you apply for fingerlings production at your hatchery in the last 12 months?

- | | |
|--|--|
| <input type="checkbox"/> Formulated commercial feed (floating) 2mm | <input type="checkbox"/> Farm-made feed (sinking) 2mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 3mm | <input type="checkbox"/> Farm-made feed (sinking) 3mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 4mm | <input type="checkbox"/> Farm-made feed (sinking) 4mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 5mm | <input type="checkbox"/> Farm-made feed (sinking) 5mm |
| <input type="checkbox"/> Formulated commercial feed (floating) 6mm | <input type="checkbox"/> Farm-made feed (sinking) 6mm |
| <input type="checkbox"/> Formulated commercial feed (sinking) 2mm | <input type="checkbox"/> Household / kitchen waste |
| <input type="checkbox"/> Formulated commercial feed (sinking) 3mm | <input type="checkbox"/> Mixed commercial and farm made feed |
| <input type="checkbox"/> Formulated commercial feed (sinking) 4mm | <input type="checkbox"/> Other (specify) |
| <input type="checkbox"/> Formulated commercial feed (sinking) 5mm | <input type="checkbox"/> None |
| <input type="checkbox"/> Formulated commercial feed (sinking) 6mm | |
| <input type="checkbox"/> Farm-made feed (floating) 2mm | |
| <input type="checkbox"/> Farm-made feed (floating) 3mm | |
| <input type="checkbox"/> Farm-made feed (floating) 4mm | |
| <input type="checkbox"/> Farm-made feed (floating) 5mm | |
| <input type="checkbox"/> Farm-made feed (floating) 6mm | |

Feed use –
fingerlings

- Select all that applies

- Household / kitchen waste
- Mixed commercial and farm made feed
- Other (specify)
- None

» **Feed applied for fingerlings**

1

How much Mixed commercial and farm made feed did you apply for fish seed production (kg)?

% of protein in Mixed commercial and farm made feed

Did you buy the Mixed commercial and farm made feed

- Yes
- No

Total cost of Mixed commercial and farm made feed applied (Naira)

Record

- the quantity applied
- % of protein
- Total cost for the past 12 months

Section H: Labour Use & Cost

Type of labour

- Household
- Hired part-time
- Hired full-time

» Labour

1

Number of male persons

Number of days worked per male person

On average, number of hours worked by men in fish seed production during the last 12 months?

Type of labour

Number of

- Male persons
- Days worked
- Hours work

Number of female person days

Number of days worked per female person

On average, number of hours worked by women in fish seed production during the last 12 months?

Total amount of money paid for men during the past 12 months?

Naira

Total amount of money paid for women during the past 12 months?

Naira

Type of labour

Number of

- female persons
- Days worked
- Hours work

Total amount paid

- for men
- for women

Section I: Other Expenses in Fish Seed Production

Now, I will ask you about other expenses you may have incurred in fish seed production during the last 12 months.

Type of expense for Land and building

- Land
- Site evaluation & selection cost
- Warehouse (for equipment and feed)
- Offices and on-site housing facilities
- Other (specify)

Specify other

Other expenses

- Select all that applies

» Land and building expenses

1

Do you have this item/facility?

- Yes
 No

Is this rented/leased or bought/owned?

- Bought/ owned
 Rented/ leased

What year was acquired or built?



Total cost of purchase/ rental per lease period

Naira

If bought, what is the estimated lifespan/useful life of the facility (in years) from the time it was bought?

- Provide details for the expenses.
- If bought, indicate the year.
- Total cost.
- Estimated life span (**very important**).

Type of expense for Pond construction

- Construction & installation of fish pond
- Water system (water inlet and outlet/monk)
- Plumbing/pipping system
- Pumps
- Aerators
- Scoop nets etc.)
- Other (specify)

Type of expense for Machinery, equipment, furniture & fittings

- Generator
- Cold storage or refrigerator for hormone and chemicals
- Water quality equipment (including oxygen meters)
- Security/monitoring equipment (CCTV, lights, etc.)
- Other (specify)

Pond construction

- Type of expense
- Machinery, equipment, furniture and fittings
- Select all that applies

Type of expense for Pond construction

- Construction & installation of fish pond
- Water system (water inlet and outlet/monk)
- Plumbing/pipping system
- Pumps
- Aerators
- Scoop nets etc.)
- Other (specify)

» Pond construction expenses

1

Do you have this item/facility?

- Yes
- No

Is this rented/leased or bought/owned?

- Bought/ owned
- Rented/ leased

Total cost of purchase/ rental per lease period

Naira

- Provide details for the expenses.
- Total cost.

Type of expense for Other materials/tools

- Pelleting machine
- Oxygen tanks
- Plastic tank for transport
- Plastic tank for spawning
- Hapas for breeding, spawning & fry rearing
- Troughs for hatching and fry rearing
- Aerator for transport
- Car/trucks
- Motorcycle / motorized rickshaw
- Fry/fingerling graders
- Other (specify)

Record details for each of the Other material/tools cost incurred.

1

Do you have this item/facility?

- Yes
- No

Is this rented/leased or bought/owned?

- Bought/ owned
- Rented/ leased

Total cost of purchase/ rental per lease period

Naira

Type of expense for Other variable costs

- Grid electricity
- Liquefied petroleum gas (LPG)
- Fuel (diesel, petrol, e.t.c),
- Wood/charcoal
- Transport cost for feed
- Water supply and draining out
- Transport cost for fish
- Harvesting cost
- Other costs e.g. ropes, tubes, batteries, torches e.t.c

Did you incur any expenses related to Grid electricity

What was the total cost (Naira) incurred for the expense?

Record details for each of the variable cost incurred.

Section J: Management practices

On a scale of 0 (very poor) to 10 (excellent), how would you rate the quality of fish seed that you produce?



What measures or practices are you currently implementing in order to ensure production of quality fish seed for your clients?

- Attend regular trainings about fish seed quality
- Produce mono-sex tilapia
- Improved feeding of fish seed
- Use grader to grade the fingerlings of same size
- Avoid mixing of brood stock
- Only get brood stock from trusted nuclei (TBNs)
- Improved aeration of the water
- Use of chemicals to remove impurities in water
- Improved transportation using oxygenated bags
- Perform behaviour response checks on fry
- Other (specify)

- Perceived quality of own fish seed
- Measures to ensure quality fish seed
 - Select all that applies

Where did you learn about fish seed quality management from?

- Relative
- Fellow hatchery
- Extension agent
- NGO
- Research institute
- Radio
- Trader / commission agent
- TV
- Cell phone
- Other (specify)

Specify other

- Source of learning about fish seed quality management
 - Select all that applies.

Section K: Certification

Are you aware of any aquaculture standards or certification process?

- Yes
 No

Are you involved in any inspection scheme for fish seed quality?

- Yes
 No

What do you think would be the advantages of participating in inspection schemes for fish seed quality?

- A certificate is awarded to demonstrate competence in quality seed production
 Enhances trust among clients that quality is good
 Provides guidelines on quality fish seed production
 Creates a good image for the hatchery
 Ensures that clients get quality fish seed
 To obtain a better market price
 Other (specify)

Specify other

- Awareness of certification processes
- Any inspection.
- Advantages of participating in inspection schemes

If tilapia hatchery, do you think your customers will be interested in certified tilapia seeds?

- Yes
- No

If catfish hatchery, do you think your customers will be interested in certified catfish seeds?

- Yes
- No

If tilapia hatchery, would price for certified tilapia fish seed be different from that of non-certified seed?

- Yes
- No

If tilapia hatchery, how different would the price be for certified tilapia seed?

- lower
- higher

- Customer interest in certified seeds
- Price differences between certified and non certified seeds

If tilapia hatchery, would price for certified tilapia fish seed be different from that of non-certified seed?

Yes

No

If tilapia hatchery, how different would the price be for certified tilapia seed?

lower

higher

If catfish hatchery, would price for certified catfish seed be different from that of non-certified seed?

Yes

No

If catfish hatchery, how different would the price be for certified catfish seed?

lower

higher

- Price differences between certified and non certified seeds

Section L: Association

▼ Section L: ASSOCIATION

Are you a member of any fish farmers association?

- Yes
 No

What is the name of the association?

What year did you join the association?

How often do you attend meetings held by the association?

Do you hold any leadership position in the association?

- Yes
 No

- Membership to a farmer association

What year did you join the association?



How often do you attend meetings held by the association?

Do you hold any leadership position in the association?

Yes

No

How many women are members in the association?

How many men are members in the association?

- Number of men and women in the association

What are the main services that you received from the association(s) during the last 12 months?

- Fish feed
- Growth hormone
- Fertilizer
- Water treatment chemical
- Other chemical
- Other input
- Credit / loan
- Training / technical advice
- Inspection for quality
- Linking to market
- Reducing unfair competition
- Linking to finance insititutions
- None
- Other (specify)

Specify other

- Main services received from the association
 - Select all that applies

Section M: Business

▼ Section M: BUSINESS

How many peak periods in a year do you tend to experience greatest demand for fish seed?

▼ » Peak period

Describe peak period 1

Start date of peak period 1





End date of peak period 1



1

- Describe each demand peak period – period with highest number of fry/fingerling sales

Describe peak period 2**Start date of peak period 2** **End date of peak period 2** 

- Describe each demand peak period

How many off-peak periods in a year do you tend to experience greatest demand for fish seed?

▼ » Off-peak period

1

Describe peak period 1

Start date of peak period 1



End date of peak period 1



- Describe each demand off-peak period – period with lowest number of fry/fingerling sales

Would you be interested in producing fish seed of the genetically improved farmed tilapia?

- Yes
- No

What reasons motivate you to want to produce fish seed of genetically improved farmed tilapia?

- faster growth
- less feed requirements
- survives in low-oxygen conditions
- tolerant to diseases
- high-yielding
- good taste
- attractive skin colour
- high price/demand
- Other (specify)

Specify other

Choose all that applies

Explain to the respondent what we mean by genetically improved farmed tilapia!

- *A strain of tilapia developed by choosing broodstock with characteristics to breed and produce offspring with more desirable characteristics.*

Have you experienced a situation where customers want to buy more fish seed than you can supply?

- Yes
 No

What did you do to meet the customer's demand when you had less fish seed than your clients were demanding?-

- Refer clients to other hatchery nearby
 Refer clients to other hatchery far away
 Buy seed from other hatcheries and sell to the client
 Ask the client to come later when seed is available
 Nothing
 Other (specify)

Specify other

- Dealing with excess demand

Are you in any contractual agreement (oral or written) with your clients?

- Yes
 No

What clients are you in a contractual agreement with?

- Farmers
 Fellow hatcheries
 Commission agents
 Other fish seed traders
 Nucleus
 Multinational companies
 NGOs
 Fish seed distributors
 Other (specify)

Specify other

- Contract: *agreement between parties for the production and supply*
- Clients in contractual agreements with
- Select all that apply

What did the contract involve?

- Volume to deliver
- Price per unit and total price
- Date to deliver
- Size of fry/fingerlings
- Type of strain
- Other (specify)

Specify other

Do you provide any other service to your clients in addition to fish seed?

- Training/advice
- Credit
- Transportation
- Follow up visits
- Bonus fry
- Testing for sex of fry
- Other (specify)

- Contents of the contract
- Other services provided to clients
- Select all that apply

Do you keep records of your fish seed production activities?

- Yes
- No

What records do you keep?

- Amount of fry sold
- Sex of fry sold
- Age of fry at time of sale
- Weight of fry at the time of sale
- Batch no.
- Clients name and contact
- Type of seed
- Generation of the seed
- amount of feed
- price of feed
- Hormone use
- Other (specify)

- Record keeping
- Type of records
- Select all that apply

Where did you learn about record keeping from?

- Relative
- Fellow hatchery
- Extension agent
- NGO
- Research institute
- Radio
- Trader / commission agent
- TV
- Cell phone
- Other (specify)

Specify other

Our interview ends here. Many thanks for the time you have made available for this study. Is there anything else that you would like us to know

- Source of learning
- Select all that apply

Thank You



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