



TECHNICAL REPORT ON STUDENT INDUSTRIAL WORK
EXPERIENCE SCHEME (SIWES)

Siwes Report

UNDERTAKEN AT
ADMUMSHO AGRO ALLIED
AIRPORT, LAO POWER LINE, ILORIN, KWARA STATE

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SUBMITTED TO:
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APPLIED SCIENCES (IAS) KWARA STATE POLYTECHNIC, ILORIN
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CERTIFICATION

This is to certify that this SIWES was carried out by ELEMOSHO, Mariam with Matric Number: ND/23/AGT/PT/0206 in the Department of Agricultural Technology, Institute of Applied Sciences (IAS), Kwara State Polytechnic, Ilorin.

DEDICATION

This SIWES is dedicated to Almighty God, the Author and Finisher of my faith.

ACKNOWLEDGEMENTS

First and foremost, I appreciate Almighty God for giving me the privilege to partake in the Students Industrial Work Experience Scheme (SIWES).

I acknowledge my amiable and dynamic Mr and Mrs. Elemosho for their financial, moral and spiritual caring and support during the course of my SIWES programme.

I also appreciate my Industrial based supervisor for their patient, endurance, courage and kind support during the course of my stayed in the Admumsho Agro Allied.

I wish to also acknowledge my school based supervisor, for their support, encouragement and kind during their visitation to Admumsho Agro Allied.

I also acknowledge the effort of my honourable HOD and other lecturers for their words of encouragement during my stay in the citadel of learning.

Finally, I appreciate my colleagues in the same industrial based training, I pray Almighty God will grant us success in all our endeavor (Amen).

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CHAPTER ONE

1.0 Introduction

Six months industrial training was undertaken at Admumsho Agro Allied, which is located at Gbagba Phase 2, Kwara State. From 29th April, 2013 to 29th October, 2013. This training helped me in gaining practical knowledge in different areas of catfish farming which include hatchery, fingerlings production, table fish production, post-harvest processing and packaging.

This industrial report highlight on the experiences gained in the following areas; hatchery, fish spawning, artificial fertilization, different stages of catfish production, post harvest processing and packaging.

With all these knowledge acquired so far, I can give my own quota in catfish farming practices.

1.1 Objectives Of Student Industrial Work Experience Scheme.

1. It provides an avenue for students in institution of higher learning to acquire industrial skills and experience in their approved course of study.
2. It enlightens and strengthens employers involvement in educational process and to prepare students for future employment.
3. It provides students the opportunity to apply their knowledge in real work situation, thereby bridging the gap between theories and practical.
4. It prepares student for industrial work which they are likely to meet after graduation.
5. It makes one to get to know employers and make a solid network.

1.2 Brief History Of Admumsho Agro Allied

Admumsho Agro Allied came into existence on 1st February, 2005 in the first place as a private and personal project of Mr and Mrs Ademola.

The company is engaged in the business of producing catfish fingerlings and table fish. This company is also into processing, smoke-drying, packaging and distribution of different kinds of fishes starting with the catfish species. In doing this, several processing, smoking-drying and packaging technologies have been acquired, harnessed and integrated.

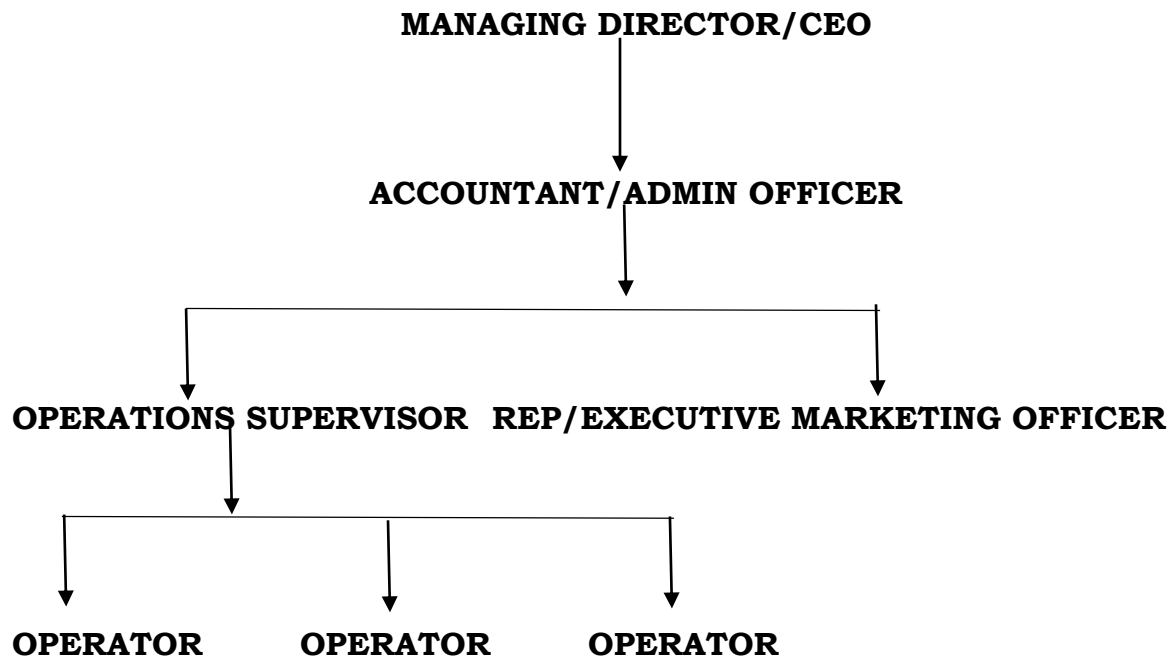
1.3 Business Operating Environment/Overview

The company is utilizing an existing privately own fish farm, research and development center owned by the present directors, Mr. and Mrs. Ademola, located at Gbagba Airport Area, Phase II, Ilorin, Kwara State.

This farm presently has the following facilities;

1. Processing bay, smoke-drying plant (150kg/batch/day) and packaging 1,500kg /day.
2. 20mx5mx1.5m ponds capacity for 25,000 table size fishes.
3. Hatchery (producing 10,000fingerlings per production twice/month).
4. Factory / farm house / staff quarters / meeting room.
5. 420ft deep water borehole with 3hp pump.
6. 2 generating sets (10kva petrol and 10kva diesel).

1.4 Admumsho Agro Allied Production Operations Organogram



CHAPTER TWO

2.1 Fish Farming

Fish farming is the principal form of aquaculture. It involves raising fishies.

2.1.1 Catfish Farming

There are two important types of catfish farming, they are;

- Nursery fish farming
- Grow out fish farming

2.2 The Nursery Fish Farming

This involves the inducement of the female fish to lay eggs which are then fertilized artificially by the male sperm, incubated and hatched. Those little fishes between a day and two weeks old are known as “fries”. These fries are then nurtured from between three and four weeks into ‘fingerlings’ which is the size suitable for use in the “grow out farming”.

2.2.1 The Grow Out Fish Farming

This is dependent on the nursery fish farming without the nursery stage. But they can be operated separately by two different farmers or the same farmer can operate both.

2.3 Stages In Catfish Farming

There are two stages in catfish farming and they include;

1. **PRIMARY STAGE** (nursery fish farming stage) :=this is between the nursery and the grow out operation, it involves the nurturing of fries three or four weeks to grow into post fingerlings, mini juvenile and juvenile respectively.
2. **SECONDARY STAGE** (grow out fish farming stage) := this is the period you nurtured the fingerlings for four to five months into grow out size/ table size fish suitable for consumption.

2.3.1 African Catfish

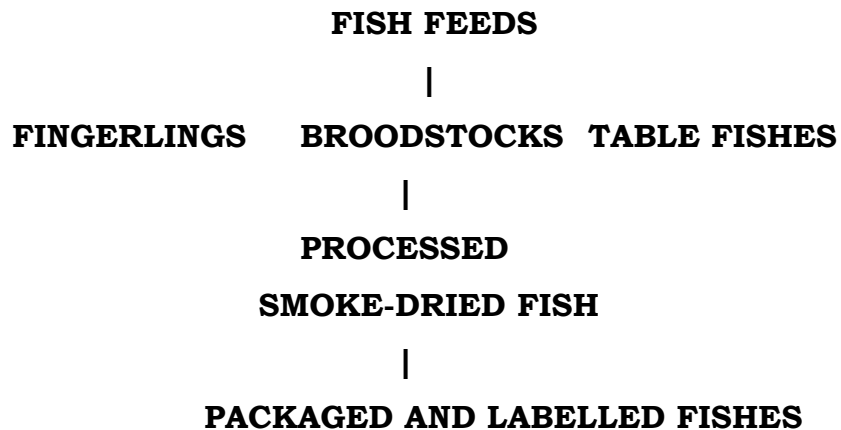
Scientific name: Clarias gariepinus

Family: clarridae

Species: clarias gariepinus

2.4 Aquaculture Value Chain

This is the different stages of fish production in which they are being added value to before reaching or getting to the final consumer ready for consumption or from the point of production to the point of marketing or consumption. The different stages of aquaculture value chain includes; fish feed production, fingerlings production, table fish production, post harvest processing, transportation, marketing.



The fingerlings, table fishes and broodstocks utilize the feed for their growth, then they are being processed into smoke-dried fish then the smoke-dried fishes are packaged and labeled.

CHAPTER THREE

3.0 Preparation Of Pond

Pond is prepared depending on the intention of the farmer.

3.1 Preparation Of Hatchery Tanks

As the name implies, hatchery tanks are tanks where fertilized eggs are spread uniformly over the net in homogenously single tanks.

3.1.1 Steps In Preparing Hatchery Tanks

Step 1: Add water in the tanks and spread salt in it.

Step 2: Leave for 30 minutes.

Step 3: Wash the hatchery tanks with hand brush both inlet and outlet and allow the dirty water to move out.

Step 4: Pour in a clean water to rinse the tanks.

Step 5: Remove the water after rinsing.

Step 6: After cleaning, add fresh water in the tanks in preparation of spawning.

3.2 Fish Hatchery

A fish hatchery is a place for artificial breeding, hatching and rearing through the early life stages of animals, hatcheries produce fry and juvenile fish primarily to support the aquaculture industry where they are transferred to on-going system i.e fish farms to reach harvest size. Some species that are commonly raised in hatcheries includes; tilapia, salmon, catfish, etc. but in this report, catfish is our main focus.

3.3 Benefits/Purpose Of Hatchery

1. Out of season production:- consistent supply of fish from aquaculture facilities is an important market requirement. Broodstock conditioning can extend the natural spawning season and thus the supply of juveniles or fry to farms.

2. Genetic improvement:- genetic modification is conducted in some hatcheries to improve the quality and yield of farmed species. Artificial fertilization facilitates selective breeding programs which aim to improve production characteristics such as; growth rate, disease resistance, survival, colour, increased fecundity and /or lower age of maturity. Genetic improvement can be

mediated by selective breeding via hybridization or other genetic manipulation techniques.

3. Reduce dependence on wild-caught juvenile:- although wild caught juveniles are still utilized in the industry, concerns over sustainability of extracting juvenile and the variable timing and magnitude of natural spawning events, make hatchery production an attractive alternative to support the growing demands of aquaculture.

3.4 Selection Of Broodstocks

1. Broodstocks that will be used for breeding must be up to 1kg to 1.5kg for the female while the male should be from 1.5 to 2kg. Also be as from 1 year and above.
2. Matured eggs showing clearly in the center of the nucleus and could be obtained by slight pressure on the abdomen.
3. The broodstock eggs should be brown in colour but if it is brownish green, it is still alright but brown eggs are the best.

3.5 Equipment Used In Hatchery/Hormonal Injection

- * Baskets.
- * Nets and sacks
- * A weighing balance
- *Sharp razor blade/knife
- *A bowl
- *Saline solution
- *Broodstocks (either 1 male to 2 female or depending on the individual)
- * Plastic spoon
- * A syringe
- * Tissue paper/hand towel
- * Ovaprim (a synthesized hormone)

3.6 Procedures For Hatchery Hormone Injection In Catfish.

1. The broodstocks (females) were taken out from the broodstock pond into a bowl.
2. An empty bowl was kept on top of the weighing balance and was zeroed.

3. The broodstock were then placed inside the bowl that has been zeroed. This is done in order to measure the weight of the broodstocks to be used for spawning. The reason for weighing the broodstock is to know to the quantity of ovaprim that will be injected in them. **example**; for 3.8kg of a female fish, 1.9ml of ovaprim will be injected. (i.e; 0.5×3.8)ml=1.9ml. For 1.8kg of fish, 0.9ml is injected. (i.e; 1.8×0.5)ml=0.9ml.
4. Then inject the broodstocks with ovaprim hormone at 0.5ml/kg of their body weight or grinded pituitary glands of the mate and leave them for 8-10 hours, this will cause swelling of the abdomen.
5. Wash the baskets and nets and sacks to be used with saline solution for them to be disinfected. Then place the nets and sacks lightly on each basket, and then place them on the already prepared hatchery tanks. **NOTE**: Make sure the PH of the water in the hatchery tanks has been tested before pouring the eggs in them. Suitable PH for hatchery is 6.8-9.0.
6. Make a saline solution using 2litres of water and a leveled salt in a teaspoon.
7. Then bring the male broodstock, cut or make an incision from the position of the papilla (penis), bring out the gonad (testes)(two in number). If the gonad is stained with blood, wash them in a saline solution, then make an incision to extract milt from the gonads to a clean bowl.
8. Then bring the female broodstocks that was injected with ovaprim, remove the water from the bowl and carefully bring out the female without struggle. Dry them gently with hand towel. Hold one of the female broodstock tightly and place in a clean bowl. This is done by two people, a towel or tissue paper is used to cover the head/eyes by one person then the other person strips the female manually by pressing the abdomen with the thumb from the pectoral to genital papilla, this is done to extract the eggs from the female.

9. Then mix the eggs from the female with the milt from the gonad of the male and add a little saline water to mix very well with spoon. Then take the mixture to the prepared hatchery tanks, take a little water from the tank and mix with the mixture this will make the temperature of the water to stabilize with the eggs).
10. Then pour the mixture in the baskets by spreading the eggs evenly in the baskets containing nets/sacks. Then leave to incubate after 48hours, the eggs are hatched.

3.7 Management Of Hatchery

Make sure that there is constant flow of water in and out in the hatchery tanks, this helps reduce odour and death of the larval. Also make sure that there is air bubble in the tanks, this helps for their oxygenation. It must be constant. As hatchery takes place, the net is turned upside down and removed immediately as soon as hatching occurs.

Admumsho Agro Allied has overhead tanks which were constructed using PVC pipes in the farm. This is because incubation period depends mainly on water supply and air temperature. When the fish egg hatch, the healthy larval swims to the end of the tank and cluster. Siphoning was supplied to remove dead eggs, egg shells and deformed larval.

The newly hatched larval depends on yolk sac for their food for three days. There was no introduction of feed.

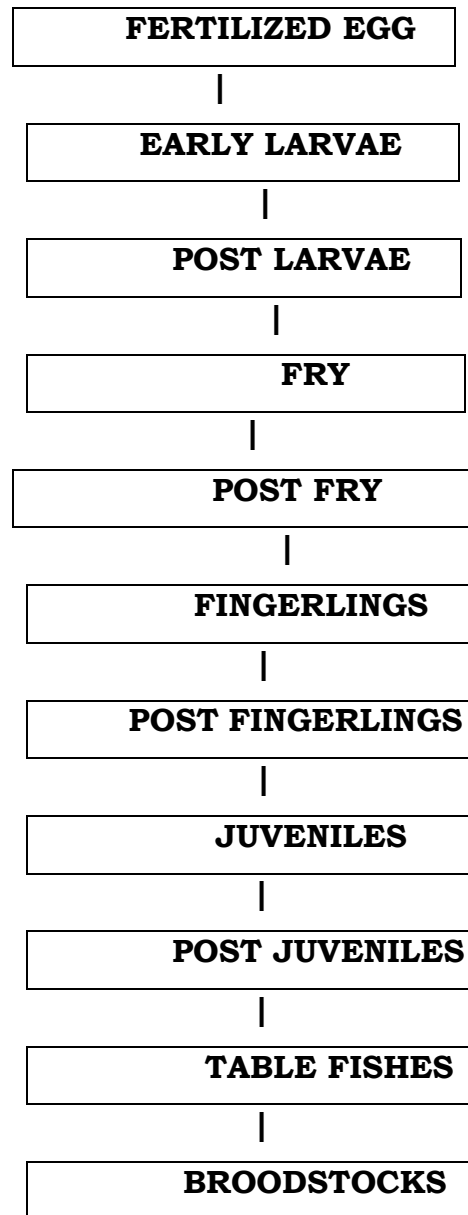
3.7.1 Nursing Of Early Fry.

At early fry, the larvae began to swim in a fish-like manner. At this time, the first feed given to them is 'Artemia' (shell free) and the feed were given at two hours interval provided that the previous feed has been consumed. In Admumsho Agro Allied, an automated feeder is used in feeding them.

3.7.2 Nursing Of Post Fry

At this stage of development, care should be taken because the fry are very fragile. At this time, the feed introduced to them is artemia mixed with fishmeal and egg yolk (sieved). After one week of administration, they were given 0.2mm (coppens feed).

3.7.3 Stages Of Fish Development



CHAPTER FOUR

4.0 Post Harvest Processing Of Fishes And Packaging

4.1 Post Harvest Processing Of Fishes

This include all steps, process and/or activities involved immediately after catch, handling and transportation, processing and distribution of fish and fishery products like; fish egg, fish oil, etc.

Fish is an important source of protein and its harvest, handling, processing and distribution provides livelihood for millions of people as well as providing valuable foreign exchange earnings to many countries. It is highly perishable food which requires careful and proper handling, processing and distribution. Demand for fish is growing and reduction in post-harvest losses can make a major contribution to satisfying this demand, improving quality and quantity for consumers and increasing income for the producer.

The main aim of fish processing is to prevent fish from deteriorating, this is very important in processing operations.

4.1.1 Ways Of Fish Processing.

There are various ways by which one can process fish. Before the introduction of modern technology some methods such as salting and drying have been used since the ancient times other methods involve the use of chemicals and electrical devices. But whatever method is used, the fish to be processed should always be fresh.

4.2 Different Methods/Techniques of Fish Processing

We have salting, smoking, drying, curing, dehydration, canning and cooking.

- 1. SALTING:** this is the process whereby the moisture or water content of fish are being lowered or reduced to a point where micro organisms cannot live and grow. Salt improves the texture of a fish because it firms up the fish; salt partially dehydrates the fish and kills the bacteria.
- 2. SMOKING:** this is the combination of salting precooking and drying. Smoking is the final process, this dehydrates the fish further, and the smoke gives colour and flavor to the fish.

3. **CURING:** this method uses chemical preservatives (including vinegar and salt), smoke and other physical factors to reduce the moisture or water content of the fish.
4. **DEHYDRATING:** this is an artificial process of drying because it is done with the use of mechanical devices such as an oven, which produce artificial heat for drying.
5. **COOKING:** is the best way to prevent wastage or spoilage of fish.
6. **CANNING:** is the packing of fish in air tight containers such as tin cans and glass jars, this prevents air and micro organism from entering. The heat processing, microbes inside the can are destroyed, thus preventing spoilage under normal condition and allowing the fish to be stored for longer period. Sardines and salmon are the most commonly canned fish in the market.

But the method that will be laid emphasized on in this report is “**drying**”. This is used in Admumsho Agro Allied.

Drying

This method lowers the water content of the fish to a point where micro organisms, bacteria, enzymes and yeast cannot grow and multiply.

4.3 Materials Used For Drying Operation Are;

1. Smoking kiln
2. Weighing scale
3. Bowls
4. Knife
5. Fresh fishes
6. Salt
7. Charcoal/firewood
8. Table top scaling machine
9. Hand gloves
10. Lab coat
11. Transparent nylon

4.4 Steps In Drying

Step 1: HARVEST THE RAW FISHES :These are the fishes to be processed.

Step 2: KILLING THE FISHES

In killing the fishes, one makes sure that water is drained properly before killing them. The fishes are killed with electric shock or by stunning (i.e; hitting the fish on the head) or by deactivating them using salt (this makes them to struggle thereby causing them to be weak).

NOTE: Deactivating the fishes with salt doesn't mean that the fishes die completely but it will make them to be very weak. Make sure you measure the quantity of salt to be used to avoid the fishes from being salty, and then pour the salt in the bowl containing the fishes and cover make sure that the bowl is water free.

Step 3: GUTTING AND WASHING

Gutting a process whereby the intestines of the fishes are being removed. You can either use a razor blade to gut or a knife. You slice or make an incision in the upper part (i.e close to the head) of the fish and then remove the intestines. After gutting, you wash the fishes with clean water.

NOTE: The intestines are removed to prevent odour emanating from the fish and also reduce the activities of micro organisms. When removing the intestines, also remove the fats because this will disturb the fish from drying well. The eggs maybe removed, or not, depending on one's choice.

Step 4: SEASONING AND SOAKING

This is when the fishes are being soaked in salt solution. After gutting the fishes, wash them well and soak them In a salt solution. The salt gives the fishes a sweet taste.

NOTE: You have to measure the quantity of water to be used for soaking and also measure the quantity of salt. The fish is soaked for a particular period of time.

Another reason for putting the fish in salt solution is to stop bacteria activities. Drying does not change an already spoilt fish; rather it stops them from further spoilage. While seasoning, prepare the fire chamber.

Step 5: MAKING FORMS

After soaking the fishes to a required period of time, you arrange your trays for laying the fishes, then start making forms by either folding them or cutting them. Place the fishes on the trays.

Step 6: PREPARATION OF HEAT

In making the fire, you have to measure the quantity of charcoal and number of firewoods to be used. when the fire is set, you load the fishes. Maintain the heat but avoid excessive heat so the fishes do not get burnt. Re-heat when you notice the fire is low.

Step: HARVEST THE FISHES

Harvest the fishes when they are ready to the customer's satisfaction.

4.5 Packaging And Labelling

Package the fishes and then label them. Then take them to warehouse for delivery.

4.5.1 Importance Of Fish Drying.

1. If it become not possible to consume or sell all fish then drying is a suitable way for preserving.
2. Preservation is also needed in such place where there is poor or no transportation system.
3. Fish is very fast rotting being. So, drying is must to keep them freefrom rotting.
4. Drying fish has a great demand in the market. It also helps to meet up the fish or protein demand.
5. Drying is also being used as nutritious protein food for poultry.
6. Dried fish stays for long time.
7. As the drying weights less so, it cost less while transporting.

CHAPTER FIVE

5.1 Conclusion

The experience gained during the period of industrial attachment can never be measured. The training and practical received so far has exposed me to things I never knew before practical wise and am so grateful to the Federal Government for the good work they did by introducing this programme to students in the higher institution because it has made a lot of students to acquire skills and experience in their approved course of study thereby bridging the gap between theory and practical. With this I believe I will be able to set up my own aquaculture farm.

5.1 Recommendation

In my own point of view, I strongly recommend that the Federal Government should make it mandatory for all students in higher institution to participate in these programmes.

Government should also encourage supervisors and students by paying them enumeration.

Also, Government should recommend some private firms and Government institutions where students can carry out their training.