



REGIONAL GUIDELINES FOR THE CERTIFICATION OF FISH SEED AND FISH FEED IN THE EAST AFRICAN COMMUNITY (EAC)



SEPTEMBER 2021

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FOREWORD

The importance of aquaculture in ensuring a consistent supply of animal protein in the form of fish and other edible aquatic species of plants and crustaceans for human consumption cannot be overemphasized. Fish and other aquatic animal species in general are a much healthier sources of animal protein compared to livestock commonly consumed globally. As the human population continues to grow, finding means to feed the increased human population is one of the most important challenges faced around the globe. Harvests of wild sources of fish, crustaceans and other aquatic animal species cannot keep up with the demand presented by the rapidly growing human population. This leaves aquaculture as the only viable alternative to supply the required animal protein.

In addition, increasing trade in fish and fishery products between developing countries especially the East African Partner States and other developed countries exerts more pressure on available stocks from the wild and aquaculture. Demand for fish in the EAC Partner States continues to grow, due to both population growth and increased per capita consumption, while overall demand in developed countries (including those that have trade agreements with EAC Partner States) more than doubled since 2000. The opportunities presented for feeding the growing population and generating surplus for trade with other developing and developed countries require increased production of quality assured fish and fishery products. The undisputed source of quality products in aquaculture are fish seed and fish feed. In order to produce quality fish feed and fish seed and also be able to trace products to their sources, there is urgent need to certify, record, and monitor aquaculture input service providers such as fish seed and fish feed producers.

The need to certify and monitor aquaculture input service providers has led to the development of these *Regional Guidelines for Certification of Fish Seed and Fish Feed in the East African Community (EAC)*. I am aware that these guidelines may not be used in their entirety but may require development of additional instruments and tools to complement

them. Partner States are thus encouraged to develop customized tools based on the principles variously outlined in these guidelines to actualize the purpose of the guidelines. It is my sincere hope that the Aquaculture Competent Authorities in Partner states will find these harmonized guidelines useful and utilize them to certify the diverse service providers with the ultimate goal of improving the quantity and quality of aquaculture inputs and outputs with environmental sustainability.

Dr. Shigalla Mahongo

EXECUTIVE SECRETARY, LVFO

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ABBREVIATIONS

1. CA Competent Authority
2. EAC East African Community
3. FAO Food and Agriculture Organization of the United Nations
4. LVFO Lake Victoria Fisheries Organization
5. HACCP Hazard Analysis Critical Control Points

1. BACKGROUND

The global fish production in 2018 was estimated to reach 179 million tonnes with 82 million (46%) coming from aquaculture and 97 million (54%) from capture fisheries (SOFIA, 2020). In the East African region alone, aquaculture has more than doubled within the last decade to the current estimated annual production in the order of 0.14 million MT (LVFO, 2016). However, this rapid increase has resulted in widespread concerns, not only about the safety, quality and purity of the resulting products, but also about the effect the farming activity might be having on the environment. These environmental concerns are not only around the effect that the fish farms might be having on its immediate surroundings, but also concerning the effect any inputs, such as fish feed and feed ingredients, might be having on the wider environment.

The EAC's rapidly expanding aquaculture sector has put an increasing stress on the production resources, and the demand for quality inputs, especially fish seed and feed, is continuously rising. This is happening even as the genetic quality of major cultured species is believed to be in need of maintenance or improvement and the cost of good-quality feed ingredients is increasing. The continuous decline/stagnation of the traditional capture fisheries and the emergence of cage fish farming have now accelerated aquaculture development in the region.

In view of increased aquaculture production and trade, concerns have emerged regarding possible negative impacts on the environment, communities and consumers. Solutions to many of these issues have been identified and are being addressed. The application of certification in aquaculture is now viewed as a potential market-based tool for minimizing potential negative impacts and increasing societal and consumer benefits and confidence in the entire process of aquaculture production and marketing.

2. INTRODUCTION

Aquaculture has the potential to make a significant contribution to food security and income generation in the East African Partner States.

Public and private firms, Ministry Departments and Agencies, institutions of higher learning and a diverse array of stakeholders are involved in various aquaculture projects throughout the EAC. The potential for sustainable aquaculture development in the region remains high and with increasing demand for fish protein coupled with the declining trend in traditional wild fisheries, aquaculture is increasingly becoming key in the animal protein supply both for human consumption and livestock. Key to aquaculture development will be the provision of sufficient quality fish seed and feed for the key culture species namely Nile tilapia, African Catfish, Mirror carp and other emerging native species (e.g. *Bagrus*) that will be domesticated and cultured in the region.

Currently, the produced seed is not meeting both the quantity and quality requirements of the sector, with the quality of the locally produced feeds in the region being criticized leading to immense importation from outside the region. There are also some concerns with regard to poor growth and vulnerability to diseases in most of the local strains. The issue of quality could be arising from inbreeding, depression, poor broodstock and poor hatchery management practices, all of which lead to non-realization of the full potential from the aquaculture industry and discouragement of some farmers. Fish feed account for 50 to 60% of the cost of production and therefore needs to be of good quality. Most of the feeds produced within the region are of low quality and imported feeds are expensive and not affordable by the majority of the small-scale farmers. To ensure the sustainability of both the quantity and quality of fish seed and feed urgently required in the aquaculture sub-sector, it is essential that the hatcheries use best known practices in terms of broodstock management, breeding and husbandry practices. Hatcheries should also use broodstock from certified farms or hatcheries based on the best available current scientific advice. Similarly, it is prudent that feed producing firms use standard operating procedures that are properly certified by the national competent authorities. To affect this, an immediate need for certification of fish feed and seed production centres guided by these guidelines is therefore urgently needed.

However, it is essential to note that currently, production and sale of fish products is a widely dispersed and unorganized activity that operates at various social, economic and geographical scales in the EAC. Notwithstanding, the need to make the fish seed and feed production and utilization environmentally sustainable and socially equitable, it is an enormous task to bring the whole range of seed production activities under the certification regime. It therefore means that the process needs to be done in a phased manner after sensitising all key stakeholders. It is also important to launch a sensitization campaign through national competent authorities to build the necessary awareness among the feed and seed producers and ultimately the users about the need to make fish feed and seed production economically viable and environmentally sustainable through certification process. These guidelines will therefore go a long way in sensitizing and giving national competent authorities a harmonized approach to the wider certification processes and procedures.

3. RATIONALE

The Fisheries and Aquaculture Sectoral Council of Ministers in their meeting held on 2nd March 2018 urged Partner States to develop harmonized standards and certification procedures for fish seed and fish feed across the region (FASCoM/RS1/7.3 (I)).

Quality fish feed and seed are not only important in line of aquaculture production but also facilitate international trade in fish and fishery products and inputs. However, in international trade, labelling of products is mandatory. Labelling and certification are important for traceability and are a requirement from some international organizations like the Food and Agricultural Organization (FAO) of the United Nations. FAO's guidelines on certification therefore give importance to development of fish seed and feed certification guidelines as part of the aquaculture certification system. The essential elements of a certification process are therefore given in these guidelines.

There is need to lay a strong foundation for the aquaculture sector by ensuring good, known, desirable, verifiable and quality fish seed and feeds including feed ingredients are available to farmers. This will ensure availability of sufficient quantities and facilitate synchronizing national and regional requirements. Traceability of seed and feed will make it easy to monitor and address issues of biosecurity and reduce disease spread. Standard labelling will be developed and the trust of investors interested in the region shall be built.

4. OBJECTIVE OF THE GUIDELINES

The overall objective of these guidelines is to develop harmonized criteria for certifying, recording and monitoring of firms/institutions/individuals involved in the production of fish seed and feed to produce both adequate supply and quality assured products while ensuring fish health, safety and environmental sustainability. This will be achieved through the following specific objectives:

- i. Develop a mechanism of identifying, registering and monitoring fish feed and seed producers in the EAC;
- ii. Produce quality assured fish feed and seed for increased aquaculture production in the EAC region;
- iii. Put in place a system that ensures compliance with regional and international standards of fish seed and feed;
- iv. Promote environmentally sustainable aquaculture enterprises in the EAC region;
- v. Provide a system of traceability of aquaculture inputs in the region.

SECTION I: FISH SEED PRODUCTION AND CERTIFICATION

1.1 REQUIREMENTS FOR FISH SEED PRODUCTION

Fish seed is defined as fertilized egg, fry, fingerlings and post-fingerling of a particular fish species. Fish seeds should meet quality standards with the following characteristics: They should be genetically pure and true to the species; fast growing; high survival; uniform sizes within a batch; minimal deformities; free from diseases and parasites and with no external damage.

1.1.1 Requirements for a seed production facility

The seed production facility should have the following:

- i. Approval documents from the Competent Authority (CA), a clear business plan and documented standard operating procedures for the production facility;
- ii. Good quality, screened, adequate and unpolluted water supply all year round with means to monitor and maintain quality;
- iii. Brood fish of known origins for traceability, qualified hatchery manager, trained staff, a management plan, adequate technology and reliable production facilities;
- iv. An adequate feeding regime at each stage of fish production, from live feeds to complete feeds for grow-out and brood-stock;
- v. Clean and clear designated areas for holding brood-stock, propagation, nursing, holding young fish and quarantine facilities;
- vi. A quarantine facilities which is a closed holding area kept some distance from the hatchery where fish from outside the farm are kept in individual tanks until the results of screening for known diseases or disorders are known;
- vii. Use of only approved hormones and gonadotropins for sex reversal and propagation;
- viii. Production and handling materials and equipment such as; aerators, graders, digital balances, nets, water quality meters, incubators,

- polythene bags, oxygen facilities, packaging materials and trays should be well maintained and stored in designated areas;
- ix. Materials and equipment for conditioning and transportation of live fish which guarantee high survival rates;
 - x. Good records keeping of origin of inputs, stocking, growth performance, feeding, health, harvests by dates and seed customers should be maintained for planning and traceability for at least two years;
 - xi. Adequate biosecurity and biosafety measures in place, appropriate protective gear for farm production personnel and adequate and safe storage facilities for biological and chemical agents.

1.1.2 Requirements for production of quality brood-stock

Brood-stock production should observe the following:

- i. Ensure parentage is known; only brooders from known authenticated sources approved by the CA should be used;
- ii. Keep stock lines in secure and separate holding facilities and maintain a systematic record of fish stocks;
- iii. Prevent any deliberate or accidental introduction of inferior fish species which may crossbreed with the desired fish species;
- iv. Reduce inbreeding (breeding between closely related fish) by maintaining a large population of brood-fish and ensuring that a large proportion of them get a chance to breed;
- v. Eliminate from the breeding system any fish that have questionable characteristics, for example slow growth, deformities, signs of disease or parasites, blindness, or unusually large and hardened belly;
- vi. Manage brood-stock properly to prevent disease outbreaks;
- vii. Replace brood-fish every 36 months;
- viii. When replacing aging brood-fish, select fish from different parentage to minimize inbreeding.

1.1.3 Disease Control

In-case of a confirmed disease out-break, the owner must immediately report to the CA if the disease is contagious. The CA should quarantine the farm, investigate the outbreak and recommend corrective measures. In addition the Competent Authority should inform other farms about the disease and preventive measures.

1.1.4 Packaging, labelling and traceability for fish seed

The following should be observed in packing, labelling and traceability:

- i. Fish seeds should be packed in oxygenated and suitable weather-resistant material;
- ii. Materials for fish seed packaging may include; aerated tanks with filtration, inflated oxygenated bags and clear polythene bags. The packaging container should be clean and durable for transportation;
- iii. The number of fish seed in a package will be determined by the volume of oxygen, the average weight of the fish packed and duration of transportation;
- iv. Each package for fish seed should be of correct water temperature that favours survival of the fish;
- v. Packaging materials should adequately be labelled and contain the following information:
 - Species name;
 - Weight and quantity;
 - Batch number;
 - Name and physical address of the production facility;
 - Instructions for handling;
 - Name and address of consignee.

1.1.5 Requirements for fish seed transportation

Transportation of fish seed should be conducted in accordance with the rules and regulations of the CA as follows:

- i. Seek approval from the CA;
- ii. Ensure that fish are free from any notifiable diseases;
- iii. Ensure that water used during transportation of live fish is safe and of good quality;
- iv. Starve the fish prior to transportation to reduce excretion and contamination of transport water;
- v. Keep records on the condition of fish, quantities and type of fish;
- vi. Ensure that fish are handled in a manner that minimizes skin damage or stress;
- vii. Ensure that tanks/packages are adequately aerated to prevent oxygen depletion during transportation;
- viii. Put in place contingency plans in case of delayed transportation;
- ix. Ensure that transport equipment and gears are cleaned and disinfected to prevent contamination before and after transportation. Disinfectants may include sodium hypochlorite at 1% solution, Iodine-based solutions or drying equipment and gears for a minimum of 48 hours, preferentially in direct sunlight;
- x. Prevent transportation from areas issued with fish health notifications without consulting CA.

1.1.6 Requirements for clearance of fish seed at border points

The following requirements should be met:

- i. Any fish seed for export/import should have a sanitary health certificate issued in respect of the batch or consignment according to the relevant regulations;
- ii. All consignment should be accompanied by traceability documents such as sanitary health certificate, in-transit certificates, import/export permits and certificates of origin;

- iii. Import/export permit should be from the relevant authority detailing fish species, origin and intended purpose for importation/exportation;
- iv. The fish should meet the requirements for fish seed transportation as given above;
- v. Fish seed imported from outside the country should be put under quarantine for at least two weeks at the farm level;
- vi. The fish seed should be inspected at the border point of entry/exit to confirm the consignment and vessel/carrier details.

1.2 CERTIFICATION OF FISH SEED PRODUCTION FACILITIES

Certification of fish seed is a procedure by which the CA gives a written assurance that the fish seed production facilities conform to the national requirements. Certification is done to ensure placement of high-quality seed on the market and increased farmed production with minimum effect on the environment. The Competent Authority in collaboration with relevant institutions should develop national guidelines for the certification of fish seed and also put in place implementation process. The CA should also provide information regarding application for certification, inspection and should appoint a technical team to undertake the assessment and provide recommendations. The technical team should have representation from the Aquaculture management and research Institutions, National Bureau of Standards and representative of the fish seed producers Association.

The CA should perform the following:

- i. Create awareness on the certification process and its importance;
- ii. Prepare detailed inspection criteria for the technical team to use during assessment of productions;
- iii. Appoint a technical team to undertake assessments and produce reports;
- iv. Consider recommendations of technical team and approve those who met the set standards;
- v. Issue species specific certification certificate;

- vi. Ensure certification of fish seed production facilities across the country;
- vii. Take up legal issues that may arise during the certification process;
- viii. Review certification process when need arise.

1.2.1 Application for fish seed certification

The production facility should apply to the CA and include but not limited to the following:

- i. Date of application;
- ii. Information on the production facility: Name, Telephone Number (office, mobile) and email;
- iii. Location: District/County, Sub-County/Ward, Parish, village;
- iv. Ownership: Government/Private/ Farmer group;
- v. Farm details: land area, water area, land ownership (own/lease/other), rearing space (number and area of broodstock ponds and nursery ponds);
- vi. Broodstock information: origin of first broodstock (source, place, size and number), history of replenishment (source, place, year, size and number), own brooder raising program;
- vii. Source of water (well, lake, river, stream) and energy used on the farm (electricity/generator), seed sales, fish species;
- viii. Education qualification and experience of manager;
- ix. History of disease outbreak, if any;
- x. Trade Licence Number-Year of incorporation/ registration.

1.2.2 Inspection criteria for seed production

The inspection criteria for the certification of fish seed should consider but not limited to the following areas:

- i. Good water source, adequate supply and quality. Presence of filtration, treatment and testing with waste management provisions;

- ii. Appropriate farm equipment and gear (fry nets, sampling nets, harvesting nets, fish graders);
- iii. Designated facilities for holding, separation, conditioning, spawning, rearing and nursing;
- iv. Competence of hatchery operator – a qualified technician from a recognized fisheries institution with a minimum qualification of certificate in aquaculture management;
- v. Clear plan on broodstock sourcing and management;
- vi. Bio-security measures-quarantine and disease treatment areas, personal hygiene measures, use of clean equipment and materials, etc;
- vii. Mitigation measures where hormones are used;
- viii. Record keeping at all levels and traceability measures to trace back the source of broodstock and destination of fingerlings;
- ix. Live fish transportation facilities (polythene bags, oxygen cylinder, wooden box where to place bags);
- x. Electricity/stand by generator;
- xi. Prevention measures of fish escape into the wild.

1.2.3 Inspection process of fish seed production facility by the technical team

The process of inspection should include reviewing submitted documentation, communicating to the production facilities the date of inspection, having an opening meeting, assessment of the facilities, review of the management records and procedures and a closing meeting. The opening meeting serves to have introductions, purpose of inspection, identify areas, documents and personnel to be involved, get information on the production systems and conditions and also discuss details of the inspection.

The technical team should give verbal feedback during the inspection. The closing meeting enables the management and the technical team to discuss the outcomes of the inspections, agree on the non-conformances identified and corrective action to be undertaken. The management of the facility should prepare a corrective action plan and

submit to the CA within a period of two weeks after the date of inspection or any other agree period.

1.2.4 Frequency of compliance inspections

The CA should put in place compliance inspections. The production facilities which are more compliant should be inspected bi-annually but the less compliant ones should be inspected regularly to ensure that they become more compliant within a short time.

1.2.5 Certification of a facility where ownership changes

In case of change in the ownership of a fish seed production facility, apart from following national legal requirements for the same, both the new and old owners should inform the CA in writing of the changes along with the documents of the changes and apply for transfer of the certificate to the new owner. To obtain the certificate, the new owner should submit an undertaking to maintain all the norms and quality standards required for certification.

1.2.6 Cancellation of certification

The certification of a production unit should be cancelled under one or more of the following circumstances:

- i. The facility ceases to abide by the set requirements prescribed by the Competent Authority;
- ii. The facility is not functional for more than one year without any valid reason;
- iii. The facility fails to rectify faults noted and given in writing by the Competent Authority for a specified period of time;
- iv. The facility is found using prohibited ingredients or species as per national regulations;
- v. The facility obtained the certificate by submitting incorrect information.

1.2.7 Revalidation of Certification

Certification of fish seed producers should be valid for a period of three years and apply for re-assessment before the end of the validity period. The process should require all the processes required for certification of a new production unit.

1.2.8 Display of certificate

The certificate should be displayed at a visible prominent place within the production facility.

SECTION II: FISH FEED PRODUCTION AND CERTIFICATION

2.1 REQUIREMENTS FOR FISH FEED PRODUCTION

Fish feeds are a complete diet for fish and may be produced in forms of pellets, flake and powder. Fish feed contain different percentages of protein, lipids, carbohydrates, ash, phosphorus, water and trace amounts of vitamins and minerals. Generally, carnivorous fish, juvenile fish and fry require higher protein content. Anyone who wants to manufacture fish feeds should apply for certification to the office of the Competent Authority and attach the following details;

- i. Name of the feed manufacturer, telephone number, email and copy of the identity card;
- ii. Physical address, location and contacts of applicant;
- iii. Type of products produced and their form/quantities;
- iv. Certificate of Incorporation where applicable;
- v. Trade license where applicable;
- vi. Project description and suitability studies;
- vii. Environmental and social Impact studies.

2.1.1 General Requirements for fish feed and raw materials

The fish feeds/raw materials must meet all requirements of the Competent Authority and should be accompanied by all the relevant documents including certificate of origin/health certificate in case of importation. The imported products should have been inspected and verified by Border Fisheries Inspector at the entry point or bonded warehouses/Inland Container Depots upon arrival in the country.

2.1.2 General quality requirements for feed ingredients and raw materials

- i. All ingredients and raw materials should not be decomposed or deteriorated and shall comply with the relevant National standards;

- ii. Ingredients of animal origin should be sterilized before use;
- iii. Where soybean meal is used, it should have been subjected to adequate heat treatment to reduce the activity of trypsin inhibitor;
- iv. Vitamin preparations added to feed should be in stabilised form;
- v. Urea or any other nitrogenous substances should not be added to or included in any fish feed except such true protein and amino acids as required in this standard.

2.1.3 Requirements for feed/raw material storage

All storage areas shall be designed and maintained to prevent damage, deterioration, contamination, unintended mixing, or spoilage of feed, ingredients and packaging materials.

- i. Stored feed and feed ingredients, fixed or mobile bins, silos, tanks and bagged storage areas should be clearly identified by either labelling or numbering. Documentation and records should be maintained;
- ii. Silos, bins or tanks and warehouses should be clearly identified and designated for specific ingredients and inspected regularly for structural integrity and condition of contents. Bins and storage areas should be ventilated to avoid condensation;
- iii. Storage areas for bagged materials should be maintained clean and tidy to minimize the risk of product contamination by vermin and birds;
- iv. The size of the storage areas should be sufficient to enable proper separation of different materials including separation of processed feeds from unprocessed ingredients;
- v. Documented inventory practices providing for a 'first in first out' (FIFO) system;
- vi. The presence of undesirable substances (nitrite, mercury) in feed and feed ingredients should be monitored and controlled;
- vii. Feed and feed ingredients should be delivered and used before the expiry dates;
- viii. The establishment shall maintain records identifying the immediate supplier, quantity, type/name and date received for

each feed and/or feed ingredient for a period equivalent to the declared shelf life of the product.

2.1.4 Requirements for non-feed and feed ingredients storage

- i. Storage on-site of potentially hazardous materials should be minimized. These include but not limited to pest control baits, boiler water treatments, cleaning agents or substances used to control odour. All such materials should be stored securely away from ingredient storage areas and access points to the production line (such as hand tip hoppers or grains inward hoppers). These materials should be stored close to the point of intended use (e.g. boiler water treatments should be stored in or near the boiler room);
- ii. Chemicals used as part of the pest control program represent a significant potential risk to feed safety and should be used with caution and in a controlled manner, according to the label, by qualified trained personnel. All chemicals used for pest control should be registered for their intended use. Using a pest control contractor who does not store such materials on the mill site is preferable;
- iii. Access to cleaning agents should be limited to cleaners (if a contractor is used) and/or trained mill staff. Cleaning agents should be stored securely after use in a designated area. Records of the type and quantity of cleaning agents on site should be kept;
- iv. A documented inventory control system should be implemented and maintained for all chemicals used on site;
- v. Any other material coming on to the mill site should be assessed for its potential to impact on any aspects of product safety or quality. All reasonable precautions should be taken to prevent non-ingredient materials from being incorporated into any stock feed;
- vi. Waste and materials not suitable as feed should be isolated and identified. Only recovered as feed after freedom from hazardous contamination has been assured. Any such materials containing hazardous levels of veterinary drugs, contaminants or other hazards shall be disposed of in an appropriate way and not used

as feed: If freedom from hazardous contaminants cannot be established, the material shall be destroyed.

2.1.5 Production of quality and safe fish feed

The production of reliable quality and safe feed depends on the adoption of an appropriate nutritional specification to develop a feed formulation which is then implemented using appropriate operating procedures in the production process followed by proper packaging and labelling. To achieve this, feed manufacturers shall comply with the following:

2.1.5.1 Specifications for fish feeds

This should include:

- i. A written nutritional specification, feed ingredient limitation and ensure compliance to the current legislation;
- ii. A uniquely identified formulation document derived from the product specification. Each version of a formulation should be identified with version number and date recorded; and
- iii. Only the current formulae in use.

2.1.5.2 Operating procedures for feed manufacturing

There should be documented procedures:

- i. Indicating each stage of production;
- ii. On production plan to minimize risk of cross contamination;
- iii. On inspection and maintenance;
- iv. On sampling;
- v. On rework;
- vi. On Pathogen control such as heat treatment or the addition of authorized chemicals; and
- vii. On feed milling, mixing, weighing and packaging.

2.1.5.3 Transport of feed and feed ingredients

- i. Both feed ingredients and finished feeds should be adequately protected during transport;
- ii. All transport vehicles/vessel should be appropriately cleaned and disinfected to minimize the risk of contamination;
- iii. As a general rule load compartments should be kept clean and dry;
- iv. Where wet or sticky materials are being transported, it will be necessary to use an effective cleaning technique on the vehicles/vessel used;
- v. Transport vehicles/vessel used for medicated feed and other materials that present a high risk should be cleaned, disinfected and dried before they are used again for the transport of feed products;
- vi. Attention should be paid to contracted transport and maintenance of clean transport should be a condition of hire. Compliance with this requirement should be checked regularly;
- vii. No materials from previous loading should remain in the tank, trucks, boxes or other containers before being loaded with the feed products. Checks should be made that the previous loads carried in any transport are compatible with the subsequent load being ferried;
- viii. A prerequisite program for inspection and routine maintenance for the transport system should be in place;
- ix. The establishment should inspect conveyances for cleanliness and structural integrity prior to loading any feed and/or feed ingredient into the conveyance.

2.1.5.4 Labelling, packaging and traceability of fish feed

All packaging materials for fish feeds should be of food grade materials. In addition, all packaged fish feeds ingredients should have a clear label in a language permissible by the CA indicating the following:

- i. Packaging materials should not have had any previous use;

- ii. The packages should be securely closed and marked with the following information:
 - a. Product name;
 - b. Category of the animal for which it is intended;
 - c. Nutrient declaration;
 - d. Net weight of the product;
 - e. Batch number;
 - f. Name and physical address of the manufacturer;
 - g. Date of manufacture and expiry;
 - h. Instructions for use;
 - i. Instructions for storage

Fish feeds and ingredients **MUST** be accompanied by a traceability document and health certificates issued at the point of origin by the designated officer at the National/County/District level for the Border Fisheries Inspector to verify. Traceability document should indicate name and location of the farm/market, name of manufacture, quantity (kg), date of manufacture/expiry, destination, name, signature and stamp.

2.1.6 Risk analysis

Feed and feed ingredients should be obtained and maintained in stable condition and protected from contamination. All stakeholders in fisheries and aquaculture value chains should collaborate to identify the hazards in compliance with HACCP principles. There should be a written HACCP plan.

2.1.7 Feed safety incidents

In case there is a fish feed safety incident, the producer should inform the CA of the action taken to prevent risk arising from the use of that feed and should not prevent or discourage any person from cooperating, in accordance with State law and legal practice.

2.1.8 Health hazards associated with animal feeds

The feed manufacturer should identify hazards and demonstrate appropriate controls, preventive measures and critical control points”. The hazard inventory should be reviewed annually.

All feed and feed ingredients should meet minimum safety standards and the levels of undesirable substances should be sufficiently low such that their concentrations in human food are below the permissible limits. Maximum residue limits should comply with set standards.

2.1.9 Requirements for feed additives and veterinary drugs used in feeds

- a) Feed additives and veterinary drugs used in animal feeds should be assessed for safety and used under stated conditions of use as approved by the CA;
- b) Feed additives should be received, handled and stored in such a manner that maintains their integrity, stability and traceability to minimize misuse or unsafe contaminations;
- c) Antibiotics and other unauthorized drugs (Chloramphenicol, clenbuterol, glycopeptides, vancomycin) should not be used in feed for growth promoting purposes;
- d) Proper records on batch numbers, expiry dates, and certificate of analysis for all feed additives received for feed manufacturing should be kept in order to facilitate traceability;
- e) Mycotoxin binders should be accompanied with proven binding capacity reports.

2.1.10 Customer complaints investigation and redress

There should be a formal, documented system for registering, investigating and addressing customer problems and complaints in a timely manner

2.1.11 Factory inspection and control procedures

Inspection and control procedures should be used to verify that feed and feed ingredients meet specifications as stipulated above. A documented external audit should be carried out annually by the CA to confirm compliance.

The manufacturer should be able to carry out aflatoxin tests and moisture content of feeds and raw materials and or use properly equipped control laboratory or make use of an external accredited laboratory. Inspection, sampling and testing of feed and feed ingredients should be done by a designated officer.

The inspection regime should include the inspection of physical characteristics of colour, form, texture, odour and freedom from contamination by insect pests, from molds and excessive damage of feed and feed ingredients. The feed and feed ingredients should comply with the standard specifications.

2.1.12 Factory Sampling and testing

Sampling of all feed and feed ingredients should be done in accordance with standard requirements and techniques. The samples should be retained for a period equivalent to the shelf life of the product and records kept for a period of 3 years. The samples should be kept in appropriate, sealed and labelled containers and be disposed of safely according to laid down procedures.

Testing includes the following: (i) Chemical analysis - Testing on feed and feed ingredients should be done using the appropriate technology to ensure quality and safety. (ii) Microbiological analysis - The level of the test should be as defined within HACCP or any other relevant quality assurance system. For both cases, proper documentation and records should be kept.

2.1.13 Product recall procedure

- a) Every feed producer should have a documented recall procedure;
- b) Sufficient records and other information should be maintained for at least two years.
- c) If a feed business operator considers or has reason to believe that feed which it has produced, processed, manufactured, imported or distributed does not satisfy the feed safety requirements, it should immediately initiate procedures to recall the feed in question from the market and inform the competent authorities thereof. The operator should effectively and accurately inform users of the feed of the reason for the recall;
- d) As part of the recall procedure, all relevant contacts should be listed and kept up-to-date;
- e) There should be responsible person(s) to ensure that corrective actions are taken.

2.2 CERTIFICATION OF FISH FEED PRODUCTION

Certification of fish feed is a procedure conducted by the CA to give approval to the fish feed production facility when it conforms to the national requirements. The CA in collaboration with relevant institutions should develop national guidelines for the certification of fish feed production and put in place mechanisms for implementation. The CA should also provide information regarding application, inspection and should appoint a technical team to undertake the assessment and provide recommendations. The technical team should have representation from the Aquaculture management and research Institutions, National Bureau of Standards and representative of the fish feed producers Association.

The CA should perform the following:

- i. Guide on application;
- ii. Prepare detailed inspection criteria for the technical team to use during assessment of production units;

- iii. Appoint a technical team to undertake assessments and produce reports;
- iv. Consider recommendations of technical team and approve those who met the set standards;
- v. Issue certification certificate;
- vi. Ensure certification of fish feed production units across the country;
- vii. Take up legal issues that may arise during the certification process;
- viii. Review certification process when need arise;
- ix. Undertake awareness creation on the certification process and its importance.

2.2.1 Application for fish feed production

Application for fish feed production certification should be submitted to the CA and should include but not limited to the following:

- i. Date of application;
- ii. Information on the facility: Name of the facility, Telephone Number (office, mobile) and email;
- iii. Location of the facility: District/County, Sub county/Ward, Parish, village;
- iv. Installed capacity of the facility;
- v. Ownership: Government/Private/ Farmer group;
- vi. Trade Licence Number-Year of incorporation/ registration;

2.2.2 Inspection criteria for feed production

Certification of the feed production facility is done to ensure that the end product is of high quality and meets local, regional and international standards. The inspection criteria for certification of fish feed should consider but not limited to the following range of issues:

- i. The raw materials meet the expected nutritional and physical quality requirements necessary to manufacture good fish feed;

- ii. The conformity of the manufactured fish feeds to the recommended nutritional and physical requirement of the targeted species and growth stage;
- iii. Feeds should be free from contaminants and adulterants like aflatoxins and microbes, physical material e.g. metals, sand, stones;
- iv. Shelf life of feed;
- v. Description of the facility (plant plan and manufacture process, type/mode of feed production units);
- vi. Water supply, drainage and waste disposal;
- vii. Adherence to good manufacturing and hygienic practices including protection against vermin and undesirable animals (rats, cats, dogs, birds and bats etc);
- viii. Appropriate and recommended equipment and facilities to prevent contamination of raw materials and fish feeds;
- ix. Competent personnel for feed production and general machine operation; and worker occupational health and safety;
- x. Storage and transportation of finished products should conform to set standards;
- xi. Packaging and labelling;
- xii. Documentation and reporting relating to manufacturing processes and quality assurance like quality assurance plans, operational procedures and batches and traceability.

2.2.3 Certification of fish feed production facility

For anyone interested or intending to establish a new feed production facility should before commencing any works apply to the CA for approval. The application form should be accompanied by the following:

- i. The Certificate from National Environmental Authority for suitability of the location for construction of feed mill;
- ii. The Environmental and Social Impact Assessment (ESIA) Report;
- iii. The facility approved architectural plan at a minimum scale of 1:200 indicating;

- iv. Attach a list of the technical team of fish feed facility;
- v. The facility equipment and their respective utilization;
- vi. The sanitation facilities (shower rooms, toilets/ pit latrines, change rooms, wash basins and taps);
- vii. Water supply system;
- viii. Power supply system;
- ix. The air and moisture exhaust system;
- x. The pest control system;
- xi. Waste disposal system;
- xii. Storage facilities;
- xiii. HACCP and GMP manuals;
- xiv. Installation capacity.

For existing feed production units, the application form should be accompanied by the items specified for the new facility but also include information on finished products and annual production reports.

2.2.4 Inspection process of feed and production facilities by the technical team

The process of inspection should include reviewing submitted documentation, communicating to the production facilities the date of inspection, having an opening meeting, a site assessment, collection of necessary samples (where applicable), a review of the management records and procedures and a closing meeting. The check list should include four areas given below to assist the team to make decision on the assessment.

Critical (C) when there is a failure to comply with feed Quality and safety or legal issues;

Serious(S) condition or practice that can preclude proper implementation of hygiene practices or obtaining appropriate level of hygiene and thus leading to the production of contaminated or spoiled feed but with no safety implication;

Major (M) when there is substantial failure to meet the requirements of a standard but no risk to feed safety;

Minor (m) when full compliance with the intent or the standard has not been demonstrated.

The recommendations by the technical team should be based on the assessment of the check list.

2.2.5 Certification of a unit where ownership changes

In case of change in the ownership of a fish feed production unit, apart from following national legal requirements for the same, both the new and old owners should inform the CA in writing of the changes along with the documents of the changes and apply for transfer of the certificate to the new owner. To obtain the certificate, the new owner should submit an undertaking to maintain all the norms and quality standards required for certification.

2.2.6 Frequency of compliance inspections

The CA should put in place compliance inspections. The production facilities which are more compliant should be inspected bi-annually but the less compliant ones should be inspected regularly to ensure that they become more compliant within a short time.

2.2.7 Cancellation of certification

The certification of a production unit should be cancelled under one or more of the following circumstances:

- vi. The facility ceases to abide by the set requirements prescribed by the CA.
- vii. The facility is not functional for more than one year without any valid reason.
- viii. The facility fails to rectify faults noted and given in writing by the CA for a specified period of time.
- ix. The facility is found using prohibited ingredients or species as per national regulations

- x. The facility obtained the certificate by submitting incorrect information.

2.2.8 Revalidation of Certification

Certification of fish feed producers should be valid for a period of three years and apply for re-assessment before the end of the validity period. The process should require all the processes required for certification of a new production unit.

2.2.9 Display of certificate

The certificate should be displayed at a visible prominent place within the production unit.

SECTION III: RESPONSIBILITIES AND OBLIGATIONS OF DIFFERENT STAKEHOLDERS

Cost effective and efficient production of fish seed/feed require participation and collaboration of various institutions and stakeholders at different levels. Their responsibilities and obligations are given below:

3.1 Lake Victoria Fisheries Organization Secretariat

- i. Coordinate the development/review of regional guidelines for fish seed and feed in the Regional and International market;
- ii. Coordinate synthesis of national reports on production and trade in fish seed and feed
- iii. Provide regional fora for networking and information sharing;
- iv. Report to Sectoral Council of Ministers whenever there is a need for policy guidance in regard to implementation of these guidelines.

3.2 Fisheries and Aquaculture Competent Authority

- i. Develop policy for seed and feed certification;
- ii. Ensure development and review of national guidelines for fish seed and feed production;
- iii. Promote production of quality fish seed and feed;
- iv. Ensure certification of all fish seed and feed producers;
- v. Collaborate with relevant institutions to develop national standards for fish seed and feed;
- vi. Conduct awareness creation on the importance of conducting formal trade in fish seed and feed;
- vii. Provide technical guidance to Devolved/Local/County Governments on the need for quality fish seed and feed production;
- viii. Provide information regarding disease outbreaks in aquaculture;
- ix. Build quarantine facilities in all major entry points;
- x. Develop and review regulations for implementation of national guidelines;

- xi. Monitor and enforce compliance to requirements;
- xii. Collect and maintain a database and information about production and trade in fish seed and feed;
- xiii. Issue licenses /permits/ certificates for export and import of fish seed and feed.

3.3 Fisheries and Aquaculture Research

- i. In collaboration with fisheries management, monitor changes in the production and trade of fish seed and feed to inform policy development;
- ii. Develop, package and share research findings with the respective Director/Director General of Fisheries Management/Aquaculture and relevant stakeholders;
- iii. Conduct demand driven research to inform policy related to fish seed and feed production;
- iv. Monitor water quality;
- v. Conduct research to improve broodstocks and feed;
- vi. Provide foundation broodstock to seed producers;
- vii. Source for requisite funds to facilitate implementation of the above activities.

3.4 Local/County Governments

- i. Conduct awareness creation on the importance of quality production and formal trade of fish seed and feed;
- ii. Collaborate with National government and other relevant stakeholders to facilitate production and trade in fish seed and feed;
- iii. Develop by-laws to facilitate production and trade in fish seed and feed;
- iv. Maintain and implement by-laws related to production and trade in fish seed and feed;
- v. Monitor and enforce compliance to fish seed and feed quality requirements;
- vi. Inspect facilities for seed and feed production;
- vii. Issue of fish movement permits/Local health certificates;

- viii. Collaborate with hatcheries and feed producers to facilitate trade in seed and feed;
- ix. Collect and share data on seed and feed production;
- x. Provide/source funds for awareness creation, technical support and compliance audits.

3.5 Other Government Institutions

Ministries in charge of water should monitor water quality. National institutions in charge of Environment should conduct Environmental audits.

3.6 Fisheries and Aquaculture/Feed Associations

- i. Lobby the interest of fish seed and feed producers in matters of statutory requirements;
- ii. Create awareness on the importance of quality production and trade in fish seed and feed;
- iii. Develop mechanisms for self-regulation such as development of code of conduct among others;
- iv. Promote compliance on members and apply sanctions on errant members;
- v. Advocate for members to comply with the provisions in the guidelines, regulations and by-laws regarding seed and feed production;
- vi. Report any illegal activities regarding fish seed and feed production to the competent authority;
- vii. Collect data and information on the volume, type and value of fish seed and feed produced traded.

3.7 Fish Farmers

- I. Obtain fish seed and feed from certified operators;
- II. Comply with the best aquaculture management practice guidelines including biosecurity measures;
- III. Provide data and information on the volume, type and value of fish seed and feed produced traded.

3.8 Fish feed and seed producers

- i. Operate after obtaining the required seed/feed production/importation permits;
- ii. Ensure their products are accompanied with a health certificate/fish movement permit;
- iii. Designate an area as quarantine for fish to control disease outbreak;
- iv. Acquire necessary permit in case of imports or exports of products of inputs;
- v. Transport seed with great care and with minimum stress to ensure high survival rates;
- vi. Keep records and provide correct information and documentation when requested by CA;
- vii. Consult regularly with farmers to understand their needs and respond proactively;
- viii. Use legal inputs;
- ix. Cooperate during technical and compliance inspections.

3.9 Civil Society Organizations

- i. Lobbying and advocacy for implementation of these guidelines by seed and feed producers;
- ii. Create awareness on the importance of quality production and trade in fish seed and feed;
- iii. Support activities that facilitate production and trade in quality fish seed and feed.

SECTION IV: PENALTIES

Penalties related to non-compliance of requirements regarding production and trade in fish seed and feed should be as specified in national laws and regulations. The following areas should be considered for penalization among others;

- i. Collection of broodstock from the wild without approval from the CA;
- ii. Production of fish seed/feed without permits;
- iii. Fish seed/feed not accompanied with a health certificate/fish movement permit;
- iv. Importation and exportation without permits;
- v. Tempering with the seal or any mark put by a custom officer;
- vi. Falsification of documents;
- vii. Failure to declare the content of a consignment or under declaration;
- viii. Trading in fish listed by Convention on International Trade for Endangered Species in Fauna and Flora (CITES);
- ix. Failure to produce license on demand to an authorized officer;
- x. Refusing to stop or allow a vehicle to be searched by a customs officer at border points.

SECTION V: OPERATIONALIZATION OF THESE GUIDELINES

Partner States should endeavour to incorporate provisions of these guidelines in the national laws, regulations, guidelines and work plans for implementation. The Local/County Governments should equally cascade the same from their respective national laws, regulations and guidelines.

References

FAO. 2020. The State of World Fisheries and Aquaculture 2020. Food and Agriculture Organization. Rome, Italy.

LVFO 2016. Fisheries and Aquaculture Policy for EAC

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