



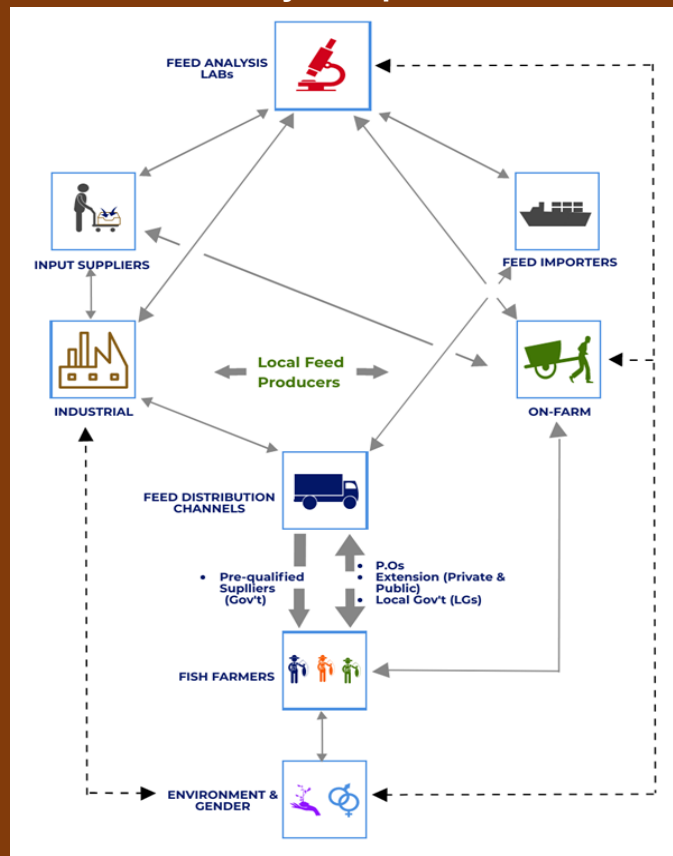
### European Commission

FED/2019/412-232

## Support to Promoting Environmentally Sustainable Commercial Aquaculture in Uganda (PESCA) under the 11th EDF - Multi- Annual Programme Estimate (FED/2018/397-275)

Upgrading the National Fish Feed Output, Quality and Reliability.

Funded by European Union



Inception report, February 2020

Prepared by Eccellenzia Consorzio Research and Management (ECRAM) Consortium



# ***Upgrading the National Fish Feed Output, Quality and reliability***

**Inception report, February 2020**

**Author: Eccellenzia Consorzio Research and Management (ECRAM)  
Consortium**

**Project Implemented by:**



## ACRONYM

ACC	Action Coordinating Committee
AFC	Aquafarm Consults Ltd
AIT	Asian Institute of Technology
ATAAS	Agriculture Technology and Agribusiness Advisory Services
BMPs	Best Management Practices
DAMD	Department of Aquaculture Management & Development
DFO	District Fisheries Officer
DiFR	Directorate of Fisheries Resources
DLG	District Local Government
EAC	East African Community
ECRAM	Eccellenzia Consorzio Research And Management
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FCR	Feed Conversion Ratio
ICT	Information and Communication Technology
IFIF	International Feed Industry Federation
ISO	International Organisation for Standardization
KARDC	Kajjansi Aquaculture Research and Development Centre
LEAF	Lake Edward and Albert Fisheries
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoFPED	Ministry of Finance, Planning and Economic Development
MTIC	Ministry of Trade, Industry and Cooperatives
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services
NaFIRRI	National Fisheries Resources Research Institute
NAO	National Authorizing Officer
NARO	National Agricultural Research Organisation
NFAP	National Fisheries and Aquaculture Policy
NLE	Nalubowa-Lusembo and Company Estates Ltd
OMAL	Owan Mwan Aquaculture Ltd
PC	Project Coordinator
PESCA	Promoting Environmentally Sustainable Commercial Aquaculture
PI	Principal Investigator
PMC	Project Management Committee
PMU	Project Management Unit
POs	Producer Organizations
SMEs	Small and Medium Enterprises
SSA	Sub-Saharan Africa
TCU	Technical Coordination Unit
ToRs	Terms of References
ToTs	Training of Trainers
UBOS	Uganda Bureau of Statistics
UNBS	Uganda National Bureau of Standards
WAFICOS	Walimi Fish Cooperative Society
WAFFICOS	West Acholi Fish Farming Cooperative Society

## GENERAL INFORMATION

<b>Reference of the call for proposals</b>	EuropeAid/161845/Indirect Management/ACT/UG
<b>Name of the lead applicant</b>	<b>Eccellenzia Consorzio Research and Management (ECRAM)</b>
<b>Title of the action</b>	<b>Lot 3: Activity 2.5. Upgrading the feed output, quality and reliability in Uganda</b>
<b>Location of the action</b>	Uganda, six regions of Uganda including Northern, North-Western, Eastern, Central, South-Western and Western, targeting <b>30</b> districts including. <ul style="list-style-type: none"> <li>• Apac, Lira, Omoro, Oyam, Amuru of <b>Northern</b>;</li> <li>• Arua, Pakwach, Nebbi, Koboko of <b>West-Nile</b>;</li> <li>• Soroti, Budaka and Iganga of <b>Eastern</b>;</li> <li>• Masaka, Mpigi, Mukono, Luweero, Lwengo, Kalangala and Wakiso of <b>Central</b>;</li> <li>• Bushenyi, Mbarara, Kanungu, Rukungiri, Ntungamo, Kisoro, Kabale and Ibanda of <b>South-Western</b>; and,</li> <li>• Hoima, Kibaale and Kasese of <b>Western</b></li> </ul>
<b>Duration of the action</b>	24 months

<b>Date of draft</b>	January 2020
<b>Period Covered</b>	May 2019 – January 2020
<b>Author (s)</b>	ECRAM Consortium

This report was prepared with financial assistance from the European Union.

The views expressed herein are those of the consortium and do not necessarily represent any official view of the EU or the Government of Uganda.

## Table of Contents

<b>Table of Contents</b> .....	5
<b>1 EXECUTIVE SUMMARY</b> .....	6
<b>2 BACKGROUND</b> .....	8
<b>2.1</b> Relevance of the Action .....	9
<b>2.2</b> The relevance of the action to national, regional and global Strategies .....	9
<b>2.3</b> Problem being addressed .....	10
<b>2.4</b> Overall Objective .....	11
<b>2.5</b> Target groups and beneficiaries .....	11
<b>2.6</b> Intervention logic .....	14
<b>2.7</b> Outputs of the action.....	14
<b>3 IMPLEMENTATION APPROACH</b> .....	16
<b>3.1</b> Inception Activity.....	17
<b>3.2</b> Project Management.....	17
<b>3.3</b> Planned Activities:.....	18
<b>3.4</b> Alignment of Project Objectives, Tasks/Activities and Outputs .....	21
<b>3.5</b> Visibility and communication strategy .....	28
<b>4 WORKPLAN</b> .....	29
<b>4.1</b> Deliverables- .....	29
<b>4.2</b> Workplan and Time table .....	30
<b>4.3</b> Log frame/ M&E plan .....	34
<b>5 CONCLUSION AND NEXT STEPS</b> .....	40

# 1 EXECUTIVE SUMMARY

This document is an inception report for the contract of 'Upgrading the fish feed output, quality and reliability in Uganda' awarded under the PESCA EU funded project. The document gives the contractor's understanding of the general and administrative provisions of the contract, presents the approach including methodology, activities, workplan and data/information collection tools. The study will be undertaken by Eccellenzia Consorzio Research and Management (ECRAM), in sub-consultancy association with Kajjansi Aquaculture Research and Development Centre (KARDC) of the National Agricultural Research Organisation (NARO), Owan Mwan Aquaculture Limited (OMAL), Nalubowa-Lusembo & Company Estates Ltd (NLE), Aquafarm Consults Ltd (AFC) and Chemiphar Uganda Limited.

Uganda's local feed output is too low to support the burgeoning aquaculture sector, with serious challenges in capacity, quality and reliability of all feed production systems in the country (FAO, 2015; NFAP, 2018). Other challenges to development of the aquaculture feed sector are; lack of dedicated facility and capacity for feed analysis & diet formulation; high cost of locally produced feeds and lack of purchasing power especially for the smallholder fish farmers; unreliable and inconsistent system of local sourcing of ingredients despite the high agricultural and agro-processing activity; inability to tap into and use many alternative potential materials which are rich in key nutrients, including different locally available grain types & protein-rich pulses; and relegation of a large productive segment of the population (women and youths) to the periphery of the mainstream aquaculture feed production and marketing value chain. The key constraints to production of quality feed in Uganda include rising production costs, which are driven mainly by the higher cost of key additives and micronutrients (most of which are imported), energy and the lack of means to enforce compliance of quality standards for feed ingredients and finished products. The latter is firstly a policy constraint and secondly a capacity building issue; i.e. a lack of farmers' capacity to assess and demand quality feed, but also their lack of capital to purchase higher-priced quality feed. This is compounded by poor-quality inputs (seed and feed) and abetted by suboptimal farm management practices. The structure of the feed industry, which consists of small farm-made feed formulators, small- and medium-scale commercial feed manufacturers, and large livestock feed manufacturers producing well-known brands of poultry feed (the bulk their output) and fish feed, presents a difficult policy issue and capacity-building task.

The small producers tend to produce lower-quality feeds (in terms of nutritive value and structure), due to the different challenges faced especially, the high cost and inconsistency of supply of hydropower electricity. Lack of a steady and affordable supply of electricity is generally a hindrance to industrialisation in Uganda. Feed quality standards, manufacturing equipment and associated processes have also been found to be inappropriate and largely inefficient. This has resulted in underperformance of the feed sector, currently operating at 25 percent of the required capacity (MAAIF, 2019). Commercial fish producers have for most part resorted to importing feed, which in poses logistical challenges and significantly diminishes the returns from aquaculture. The feed currently produced in Uganda is in general of low quality and inconsistent in standard. Uganda has no public dedicated laboratory for aquaculture and specifically feeds analysis and development. However, such capacity exists with private sector such as CHEMIPHAR. The facility in NARO-KARDC requires improvement, at least to conduct the basic analyses such as proximate analysis. There is also a going concern of research working independently of the end users and not taking in consideration the economics and logistical challenges associated with generated technologies. There are also substantial environmental, socioeconomic and technological risks associated with sourcing and supply of ingredients, such as contaminated ingredients, skewed dealership to majorly male actors, and inability to sort and ensure quality and safe raw materials. This action is intended to upgrade the national feed output, quality and reliability. The ECRAM led consortium will start with determining the current status of Uganda's fish feed industry. This activity is expected to bring out the detailed picture of how fish feeds are obtained or produced and utilized by farmers including farmers' perceptions and knowledge about the benefits of using good quality fish feeds. The team will also

assess the gender aspects in the feed value chain to increase the understanding of the role of men, women, youths and other gender in fish feed development, access and utilization. The team will profile producers, importers, ingredient suppliers, their capacity and needs in a gender disaggregated manner including environmental aspects. The team will also carry out a capacity gap analysis for the existing laboratories to monitor and certify feed production quality in the country. The findings of the above activities will be used to inform the subsequent activities and phases of the project. The next set of activities will include development of BMPs for fish feeds industry aimed at improving aquaculture production in the country. Review and reference to literature will be made about the best practices nationally, regionally and globally. The BMPs will cover aspects of quality in production and storage, distribution and usage as well as creating capacity among stakeholders to identify good quality fish feed ingredients and feeds. Dissemination materials will be produced and packaged in a user-friendly and gender responsive manner for the different stakeholders along the feed value chain. Guidelines to ensure safety and quality of feed for various actors along the value chain will also be developed and disseminated.

## 2 BACKGROUND

The key constraints to producing quality feed in Uganda include rising production costs, which are driven mainly by the higher cost of key additives and micronutrients (most of which are imported), and the lack of means to enforce compliance of quality standards for feed ingredients and finished products. The latter is firstly a policy constraint and secondly a capacity building issue; i.e. a lack of farmers' capacity to assess and demand quality feed, but also their lack of capital to purchase higher-priced quality feed. This is compounded by poor-quality inputs (seed and feed) and abetted by suboptimal farm management practices. The structure of the feed industry, which consists of small farm-made feed formulators, small- and medium-scale commercial feed manufacturers, and large livestock feed manufacturers producing well-known brands of poultry feed (the bulk their output) and fish feed, presents a difficult policy issue and capacity-building task. The small producers tend to produce lower-quality feeds (in terms of nutritive value and structure), due to the different challenges faced especially the high cost and inconsistency of supply of electricity. Lack of steady and affordable electricity is generally a hindrance to industrialisation in Uganda. Feed quality standards, manufacturing equipment and associated processes have also been found to be inappropriate and largely inefficient. This has resulted in underperformance of the feed sector, currently operating at 25 percent of the required capacity. (MAAIF, 2019). As evidence, the country's aquaculture growth rate has been tapering off after a very remarkable expansion in the first of the two decades since 2000 when public sector interventions and reforms were instituted to bolster aquaculture development in the country. Aquaculture fish production rose from 189 tonnes (t) annually in 1999 to over 110,000 t in 2012 (MAAIF, 2014), and has been tapering off since 2012, rising only by 10,000 t to 120,050 t in 2018 (MAAIF, 2019). From a general perspective, the high cost of commercial feeds and limited technical knowledge in farm-made feeds in Uganda was assessed as seriously constraining the development of aquaculture industry in Uganda (Kasozi et al., 2017). Commercial fish producers have for most part resorted to importing feed, which poses logistical challenges and significantly diminishes the returns from aquaculture. Globally, fish farming has developed considerably rising to 80 million tonnes in 2016 (FAOStat, 2019). Unfortunately, the whole of Africa region produces only 2.0 million tonnes a year from all farmed fish species, with Egypt producing over 70% (~1.4 million tonnes) of this production (FAO, 2018). Uganda is currently second to Egypt in farmed tilapia production and second in overall production to Nigeria (predominantly catfish producing country) in sub-Saharan Africa (SSA). The major challenges to aquaculture development in Uganda, like in all SSA countries are; lack of quality complete fish feeds; use of rudimentary, labour drudgery and unproductive technologies; and disfranchisement of a large segment of the population (women and youth) from aquaculture production due to inaccessibility to aquaculture inputs and lack of knowledge and skills in BMPs. Production of quality feeds in Uganda is currently limited by narrow scope of ingredient types which are highly seasonal and unreliable in supply. Elsewhere scientific research has focused on ways of manufacturing low cost but efficient fish feed using locally available ingredients and reducing reliance on the fish meal by partially or fully replacing it with other good protein sources. Locally, a number of alternative ingredient sources, especially for supply of protein, have been scientifically profiled, however their use is yet to be explored. The logistically challenged and inefficient ingredient sourcing and supply system, and limited capacity of the local feed producers to procure and store sufficient volumes of ingredients also significantly limits sustained outputs of the feed factories (FAO, 2015). This is compounded by the lack of tradition and knowhow in fish farming especially for smallholder farmers who typically manage and operate non-cash operations on a low input – low output based fish farming system. The feed currently produced in Uganda is in general of low quality and inconsistent in standard. Uganda has no public dedicated laboratory for aquaculture and specifically feeds analysis and development. However, such capacity exists with private sector such as CHEMIPHAR. The facility in NARO-KARDC requires improvement, at least to conduct the basic analyses such as proximate analysis. There is also a going concern of research working independently of the end users and not taking in consideration the economics and logistical challenges associated with generated technologies. There are also substantial environmental, socioeconomic and technological risks associated with sourcing and supply of ingredients, such as



contaminated ingredients, skewed dealership to majorly male actors, and inability to sort and ensure quality and safe raw materials.

## 2.1 Relevance of the Action

Development of the feeds sector in Uganda has been identified as critical to development of the aquaculture sector by MAAIF (National Fisheries and Aquaculture Policy-NFAP, 2018; Draft Aquaculture Development Strategy and Action Plan-ADSAP, 2020-2025). In order to produce 1 million tonnes of fish annually as set by GoU, a minimum of 1.5 million tonnes of fish feeds will be required. The proposed action here involves the following:-i) assessing current capacity, ii) applied technology, iii) value chain actors, iv) distribution channels, v) alternative sources of ingredients, vi) and constraints in feeds industry. Through the action, we shall devise strategies, make policy recommendations, develop new feeds formulae, build capacity of both industrial and small-scale feeds producers, enhance capacity for on-farm feed production, devise options for improving sourcing and supply of ingredients, enhance capacity for feeds laboratory analysis and formulation, encourage involvement of women and youth in feeds related activities, and make environment management guidelines for sustainability while boosting output and utilization of quality commercial, and on-farm made feeds.

## 2.2 The relevance of the action to national, regional and global Strategies

This action will upgrade the national feed output, quality and reliability in supply and accessibility by smallholder rural farmers by addressing the problem of unreliable quality of ingredients which is normally characterised by significant price fluctuations. The supply of ingredients is inconsistent in quantity and quality (often adulterated) which significantly affects the local commercial feed industry. The project shall focus majorly on devising a new system for sourcing and supply of ingredients, streamlining quality control and establishing linkages amongst the various actors along the value chain while improving in-house laboratory technology capability as well as the manufacturing and quality control system. The project will also streamline the value chain concept and manufacturing ethical conducts to build more trust in feed value chain. Government through a cabinet directive and recently passed National Fisheries and Aquaculture Policy (MAAIF, 2018), in effort to address the growing fish supply deficit, has set a target of 700,000 tonnes from capture fisheries and 1.0 million tonnes from aquaculture by 2025. The GoU strategy is aimed at bringing the annual fish supply to 1.7 million tonnes, and increasing fish exports to over 500,000 tonnes of fresh fish while bringing the national per capita fish consumption to over 20 kg of fish. This ambitious plan requires a paradigm shift and linking farmers directly to the market while enabling them to access quality inputs especially feeds and seed. This goal as indicated above is embedded in the NFAP (2018); and has now been set for implementation with another PESCA project supported subproject, the “Review and Updating of the National Aquaculture Development Strategy and Action Plan for 2021 to 2031”. This action is also supported by the Agriculture Sector Strategic Plan (ASSP, 2016 – 2020) and in the National Development Plan (NDP II, 2016 – 2020) where fish has been selected among the 12 priority commodities for investment to attain the set agriculture growth. This action also aligns well with Vision 2040 that aims to transform Uganda into a well-nourished population of middle-income status among other goals. This is because this action will enhance aquaculture sector contribution to local and national economies; bolster the food and nutrition status, especially of rural communities through increased farmed fish production, access to fish for food, while bringing more women and youth into the production and marketing value chains.

At a region level, Uganda remains the only producer and supplier of farmed fish to countries in Eastern and Central Africa such as; Sudan, South Sudan, Central Africa Republic, Democratic Republic of Congo, Rwanda, Burundi and Kenya. As regards to international aquaculture trade, Uganda is the only African country to have successfully gained access on to the EU list for export of inland farmed finfish products. This action will strengthen Uganda’s position in intra-regional aquaculture fishery trade and help in maintaining Uganda’s status on EU export list for farmed finfish products through support to development of feeds industry, which if poorly handled can easily affect the health of the consumers as well as the environment thus jeopardizing the continued access to these better paying markets. This action will work with feed industry, lead farmers, producer

organizations, and sector managers so as to put in place strategies for increasing feed output, quality and reliability in supply and accessibility by all categories of farmers including promoting adoption and implementing of BMPs for quality and safe farmed fishery products, that can be also exported to international markets. In addition, Uganda is signatory to the African Union (AU) – NEPAD/NPCA initiative “*Fish for All*”, and is a signatory to the proclamations and initiatives of the African Ministers for Fisheries and Aquaculture under the auspices of AU for promotion of inland aquaculture production, which calls on member states to support development of aquaculture in the region as a key contributor to local economies, food and nutrition security, livelihoods and as a means of tackling the high unemployment characteristic of many of the AU Member States’ economies. This action is also of strategic importance to Uganda in filling the CAADP Compact; and meeting the Sustainable Development Goals (SDGs 1, 2, 3, 5, 8 and 14 namely: End poverty in all its forms everywhere; End hunger, achieve food security and improved nutrition and promote sustainable agriculture; Ensure healthy lives and promote well-being for all at all ages, Achieve gender equality and empower all women and girls, ensure Decent work and economic growth, and Life underwater (UNDP, 2015).

### 2.3 Problem being addressed

Uganda’s local feed output is too low to support the burgeoning aquaculture sector, with serious challenges in capacity, quality and reliability of current local production of industrial and small-scale as well as on-farm feed production in the country (FAO, 2015; NFAP, 2018). Other challenges to development of the aquaculture feed sector are; lack of dedicated facility and capacity for feed analysis & diet formulation; high cost of locally produced feeds and lack of purchasing power especially for the smallholder fish farmers; unreliable and inconsistent system of local sourcing of ingredients despite the high agricultural and agro-processing activity; inability to tap into and use many alternative potential materials which are rich in key nutrients, including different locally available grain types & protein-rich pulses; and relegating of a large productive segment of the population (women and youths) to the periphery in aquaculture feed production and marketing value chain. Specific problems being addressed in this action are as explained below: 1) **Unavailability of feed**; The limited capacity for industrial production of complete aquaculture feed, and its concentration in urban areas has meant that the majority of farmers scattered in different remote areas cannot access the feed. Although many small-scale producers rely on fertilization and enhanced natural food for their fish, increases in production will require corresponding increases in use of quality feeds. There are three components to this problem: (a) quality, (b) quantity and (c) varying requirements for different fish species. There is also a problem that on-farm feed tends to be inconsistent in quality and quantity due to over dependency on farm by-products. As such aquaculture feeds remain a major bottleneck to expanded aquaculture production in Uganda; 2) **Prohibitive logistical costs, poor storage and poor ingredients & feeds biosafety**; Local feed production is challenged by logistics, poor handling and storage facilities, ineffective feed distribution channels, poor safety and quality assurance and control mechanisms for both ingredients and feeds; and inconsistency and unreliability of supply of ingredients and feeds; 3) **Weak research-extension-farmers linkages for effective impact**; Despite the efforts by NARO-KARDC fish nutrition and feed production research, the uptake of technologies especially on-farm feed production has been minimal due to the weak research-extension-farmer linkages. Furthermore the technologies generated normally are not farmer driven and do not solve the underlying problems regarding poor sourcing of ingredients and distribution of produced feed. 4) **Limited coordination between research and development sectors**; There is also a challenge of disconnection between research and management, leading to many cases of research and development efforts not being responsive to the needs of targeted stakeholders; 5) **Unreliable production statistics**; The gathering of data and reporting system is too ineffective leading to inaccurate feed sector data. It is the premise of this team that a lot of feed produced, especially by small-scale factories and on-farm, is not reported and captured in management data. Yet this is critical for purposes of planning, monitoring and evaluating the performance of the sector, and justifying the allocation of resources to intervene in the feeds industry; 6) **Weak extension services**; Aquaculture extension services remain unresponsive to the aquaculture sector and agricultural production sector in general despite the many efforts by GoU to revamp and make extension in the

country responsive to farmers' needs. The extension services are generally limited by being far removed from farmers, lacking of refresher or continuous capacity building, and logistical constraints, which results in weak and inaccessible extension services; 7) **Inadequate information management systems**; Access to aquaculture information is inadequate, limiting the scope, quality and utility of aquaculture research and development activities on feeds. There is lack of information flow (networking) between institutions and feeds industry despite the fact that considerable valuable information has been generated especially by research and academic institutions.

## 2.4 Overall Objective

The overall objective of this action is to increase the output, access and availability, and improve utilization of industrially and on-farm produced quality fish feed in Uganda.

**Specific objectives;** **i)** Establish roles and interactions amongst various actors within the value chains; **ii)** Ascertain availability, abundance and quality of alternative locally available feed ingredients and develop formulae for cost effective production of fish feeds; **iii)** Evaluate current fish feed utilization, fish feeding regimes and practices, and recommend ways to reduce feed wastage and improve feeding efficiencies; **iv)** Assess the research and development needs for better fish feed formulation, manufacture, storage, transportation, utilization, gender and environment responsiveness; **v)** Investigate the technical, economic and policy constraints related to the production of quality aquafeeds; **vi)** Identify the major issues for optimization of fish feeds and feed additives; **vii)** Identify the support services that are needed to build the capacity of SMEs aquafeed producers to enable them to improve the technical efficiency of their production processes; **viii)** Develop information packages for investment in fish feed production and marketing industry; **ix)** Develop alternative systems for sourcing, quality control and supply of fish feed ingredients to the fish feed production industry; **x)** Review and devise appropriate fish feeds distribution channels including proactive linkages amongst feed producers and fish farmers; **xi)** Increase the involvement of women and youth in the production, distribution, utilization of fish feeds through mobilisation, sensation, exposure and training; **xii)** Enhance stakeholders knowledge of BMPs in fish feed production and management, and environment management; **xiii)** Increase availability and accessibility of action results and outputs.

## 2.5 Target groups and beneficiaries

**i) Small holder farmers**; Smallholder fish farmers practise aquaculture on a small scale and most cases on a subsistence level having 1 to 3 fish ponds each of <500 m<sup>2</sup> or 1 or 2 cages each 10 m<sup>3</sup>. They use rudimentary technologies; do little or no supplementary feeding mostly depending on greening or fertilisation of the ponds. Mostly produce for home consumption and the remaining fish is sold to neighbours to raise a little income and mostly depend on family labour. They lack expertise in fish farming, mostly getting the knowledge from their neighbouring farmers and rarely seek out help from extension staff. In this study, working with other PESCA studies - Lots 1, 2 and 4, this group is being targeted to move them from subsistence farming to commercial farming, where they will be trained in use of appropriate technologies. In this particular study this group will be trained in using supplementary feeding either using own on-farm formulated diets or locally produced high quality feeds for Nile tilapia and African catfish. The group and their POs will also be trained in feed formulations and feeds management in order to reduce on costs of operations and increase returns on investment and make fish farming environmentally sustainable.

**ii) Feed Ingredient suppliers**; Feed ingredient suppliers sell fish feed ingredients to the local feed producers and fish farmers for making the fish feeds. This group is targeted because part of the cause of poor-quality fish feeds currently on the market is blamed on fish ingredients suppliers who are reported to compromise the quality of ingredients through malpractices such as failure to observe drying to the recommended moisture content and sometimes outright adulteration. This group will be mobilised and sensitised about the need for high quality fish feed ingredients and will be trained in ingredients sourcing, packaging, storage, vermin control and the importance of timely and consistent supply to the local feed producers. The group will be linked to the local fish feed producers, POs and smallholder fish farmers; **iii) Local feed producers**; Local fish feed producers own fish feed producing plants/industries and are producing and selling fish feeds for local and regional markets. This group is

being targeted because the major task in commercialisation of aquaculture lies with them. For commercial aquaculture, the fish feeds used must be high quality such that one uses less feeds to get more of the fish biomass accumulation, that is, low Food Conversion Ratio (FCR). In addition, the feed must be of high quality so that whatever is planned for feeding the fish is eaten by the fish to avoid uneaten feeds that pollute the environment leading to eutrophication of the waters. This group will be trained in BMPs in fish feed production based on locally produced ingredients; feeds storage and packaging; vermin control; avoidance and detection of aflatoxins; sourcing of ingredients and feed formulations based on locally produced ingredients. The group will be linked to the trained fish ingredients suppliers for consistent and quality supply of ingredients. The group will also be linked to large local crop farmers of grains and protein pulses for possible contract farming and possible reduction of middle men to ensure uncompromised quality supplies at reduced prices; iv) Fish feed inspectors; Resource managers, feed inspectors and extension staff are majorly public servants responsible for guiding aquaculture sub-sector development and commercialisation. They fall under the Department of Aquaculture Management and Development (DAMD) under the Directorate of Fisheries Resources (DiFR) in the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Some extension staff are private though not registered and certified. Being the resource managers and extension service providers, this group is being targeted by equipping them with BMPs in aquaculture, modern and appropriate technologies of aquaculture, standards (production, storage, packaging and transportation) for quality fish feeds ingredients and fish feeds, appropriate and real time data/information collecting mechanisms and tools and skills in records keeping, updating and data/information retrieval. Trained extension staff especially the private members will be linked to the smallholder fish farmers, commercial fish farmers and the POs for easing and quickening aquaculture extension provision to farmers and especially the smallholder farmers. In selecting of private extension providers to be trained, emphasis will be put on youth and women; v) Feed trade policy makers; The Ministry of Trade, Industry and cooperatives (MTIC) staff are responsible for guiding of local industrialisation; cooperatives such as POs management and regulation; and trade development in the country. Fish feed production being a nascent industry needs a lot of guidance from staff of MTIC about policy, regulations, incentives, markets – local, regional and international standards; the *Dos and Don'ts*. MTIC is being targeted to guide the local fish feed producers on growth and development of the industry to match the current and target aquaculture fish production in the country and region. MTIC staff will be sensitised about the aquaculture sub-sector and especially the importance of fast growth and development of the fish feed industry so as to aid them in the proper sub-sector's development; vi) Aquaculture Development and Financial Resource Mobilisers; Ministry of Finance, Planning and Economic Development (MoFPED) are responsible for mobilisation of resources and allocation of funds to different sectors in the country. They are also the National contracting authority for the EU PESCA project Uganda therefore, MoFPED, is very important. Under this study selected staff of MoFPED will sensitised about the importance and requirements for growth and development of the aquaculture sub-sector in the country. MoFPED will be sensitised about the importance of local feed production to the aquaculture sub-sector's growth and development and why local fish feed production requires affirmative support. vii) The academia; Research and Academia are responsible for generation, adoption, testing and improvement of aquaculture technologies to ensure fast growth and development of the sub-sector. This group will be targeted to provide skills and knowledge to farmers especially smallholder fish farmers with special emphasis to youth and women to move these farmers from subsistence level farming to commercial fish farming that ensures environmental sustainability; viii) Funders; The European Union (EU) is the funder of a number of development projects in Uganda and is funding the EU PESCA project – Uganda under the 11<sup>th</sup> European Development Fund. EU is being targeted for supporting and funding the study. EU will oversee the project execution through direct supervision, auditing and receiving of progress reports on deliverables, therefore, responsible staff of the EU will be made aware of current status of aquaculture in Uganda, the target fish production from the sub-sector and what it takes to get there. In this study emphasis will be put on the local fish feed industry.

### **Beneficiaries**

i) Fish farmers; Both commercial and smallholder fish farmers have been facing a problem of poor quality and highly priced fish feeds on the market in country. This group will benefit from this study through access to improved quality (low FCR) and cost-effective Nile tilapia and African catfish feeds based on locally produced grains and protein pulses. The group will also benefit through training in use of BMPs in fish feeds management, maintenance and monitoring of the environment where aquaculture is practised. In this group special emphasis will be put on women and youths who will benefit through increased involvement (source of employment and income) in the aquaculture sub-sector. The smallholder farmers will also benefit through their POs and extension staff being trained in on-farm fish feed formulation and processing. When one cannot afford commercial feeds they can formulate and process their own fish feeds of good quality; ii) Fish feeds ingredients suppliers and traders; This group has been constrained by unstructured and inconsistent market for the fish feed ingredients. By training them on BMPS of feeds ingredients (sourcing, determining quality, storage, packaging and transportation); linking them to local commercial feed producers; and encouraging and promoting use of fish feeds by fish farmers especially the smallholder farmers who are the majority of fish farmers, the fish feed ingredient suppliers will be assured of consistent market and good pricing without compromising the quality of the fish feed ingredients; iii) Local grains and protein pulse farmers; are currently facing a challenge of fluctuating markets that lead to huge losses. This group will benefit through training on BMPs and assured consistent market for their produce provided by the increased use of local grains and protein pulses by the local fish feed producers. Large farmers or their POs will benefit by directly being linked to the local feed producers an act that will eliminate middle men and provide them with better prices for their produce; iv) Fish feed depot managers and retailers; these are very few because the demand for feeds especially by the majority (smallholder farmers) has been very low. With the training and promotion of use of fish feeds by the smallholder fish farmers and establishing fish feeds distribution channels which will include fish feed depot managers and retailers, this group will benefit through increased consistent demand of high-quality fish feeds; v) Fish traders, processors and consumers; are current facing a challenge of well organised, consistent, synchronised and quality supply of fresh fish for trading, processing and consumption respectively. This group will benefit from this study through increased production and availability of fish by fish farmers due to increased use of quality fish feeds and use of BMPs in fish feeds management by the fish farmers.

**Table 1: Key stakeholder groups**

<b>Stakeholder</b>	<b>Current business</b>	<b>Project Role</b>	<b>Benefit</b>
ECRAM and partners consortium	Aquaculture Research & production	Research & development	Increased knowledge base
Smallholder & commercial fish farmers	Aquaculture production	Trainees, on-farm trails	Increased production through use of improved technologies
Local feed manufacturers or producers	Feeds production	Uptake of new technologies	More consistent supply of quality ingredients; improved quality and output of feeds; increased market
Resource managers & technical personnel	Management of feeds industry	Policy review, extension and support	Improved regulation policy of feeds sector
Feed depot managers and feed retailers	Distribution of feeds	Channels for fish feeds distribution	Increased sales of fish feeds due to increased demand from especially the smallholder farmers
Feed and ingredient suppliers and traders	Provision of ingredients for fish feeds production	Source of ingredients	Improved systems of ingredients sourcing, storage, packaging & transportation; assured market through linkage to fish feed producers
Research and Academia	Training and extension	Research and training	Increased knowledge base and increased visibility that will to attraction of future funding

## 2.6 Intervention logic

Principally the intervention is premised on the fact that although Uganda has nearly all the ingredients required to produce quality feed, the fish feed sector has not grown at the same pace as aquaculture production itself with majority using on-farm made feed while a substantial number of emerging commercial fish farmers rely on imported fish feed. The reason for poor performance of the fish feed sector is that there is no proper coordination of key players along the feed production, distribution, marketing and utilization chains, and the actors lack the necessary skills and knowledge to transform the abundant raw material into quality, ample and access fish feed. Understanding and streamlining fish feed value chains in Uganda and coordination of the various actors will stimulate increased quality, output and cost-effectiveness of the feed especially with measures incorporated for inclusion of gender and environmental sustainability in the feed production and marketing value chain. Conceptually we take cognisance of the fact that there is a lot of loss of value of fish feed ingredient and feeds through; poor handling, storage, processing, adulteration and poor on-farm feed management. Our plan is for this Action to facilitate improved coordination, generation and dissemination of critical information, and deliberate efforts to include women and youth in the feed production and marketing value chains, so as to trigger increased efficiency along the feed value chain, and result in more reliable and higher fish feed production output. In turn every good handle on the feeds value chain will lead to significantly improved aquaculture productivity, production and profitability. The Action is also premised on the fact that responsible use and management of environmental resources in feed production and feed application or utilization will cut down wastage, significantly reduce feed losses, and enhance the productivity and production of farmed fish. This Action therefore will work with ingredient producers and suppliers, feed producers at all scales, and lead or model farmers to promote adoption of BMPs for environmentally responsible and cost effective production and utilization of feed, This coupled with improved and reliable data capture; gender inclusive approaches and systems for feed manufacture, distribution and accessibility; promotion and establishing of legally binding engagements between ingredients suppliers and feed manufacturers; skilling of model fish feed producers on feed formulation and use of locally available and more abundant ingredients; promotion and use of quality and safety standards by ingredient suppliers and feed manufacturers; and working with established POs is expected to trigger increased use of completed feeds that are both commercially produced and distributed and those that are produced on-farm.

## 2.7 Outputs of the action

- 1) Current local fish feed production status including volume, actors, and ingredient sources profiled including the needs and capacities of actors established;
- 2) A list of locally available cost effective non- conventional feed ingredients, and 6 formulae, developed, and capacity of fish feed producers, lead farmers (including women and youth) and extension workers in use of the new technologies built.
- 3) Best Management Practices (BMPS) that are gender & environment responsive on ingredients, feed production & its management developed and POs, SMEs, feed producers, ingredient suppliers and other stake holders trained on the BMPs;
- 4) Cost and environment sustainability of different energy sources used in feed production established and appropriate cost effective models based on alternative energy sources developed for use by SMEs;
- 5) Guidelines to ensure safety and quality of feed for various actors along the value chain developed and disseminated;
- 6) Policy brief on the required changes in regulatory and policy framework to support the designed BMP for feed ingredients, feed production, distribution and on farm feed management practices;
- 7) Alternative effective and reliable feed distribution channels and linkages defined and made known to POs;
- 8) Record and data systems on quality and quantities of fish feeds manufactured, distributed and utilized developed and promoted;
- 9) Guidelines for BMPs on central fish feed data collection and management developed;
- 10) Digital media platforms (Mobile Application) to access and exchange information on fish feed and markets developed in conjunction with PESCA lot 2;
- 11) Local and international fish feed standards popularised among the fish feed value chain actors;
- 12) Environment management guidelines on feed and feed management for farmers, SMEs,

distributors and commercial producers developed, and disseminated; 13) Fish feed information gathered and packaged in various forms and disseminated to all the stakeholders and beneficiaries.

### 3 IMPLEMENTATION APPROACH

The focus of this action is to upgrade the national feed output, quality and reliability. The implementing team will start with pre- intervention activities including inception meetings and conducting a baseline survey in the 21 project districts. Structured questionnaires, focus group discussions (FGDs), and Key Informant interviews (KIs) with selected key stakeholders will be used to collect the data, following preparation of tools. The purpose of the baseline survey is to obtain a detailed and clear status about how fish feeds are obtained or produced and utilized by farmers including farmers' perceptions and knowledge about the benefits of using good quality manufactured fish feeds. Gender aspects in the feed value chain will be assessed to increase the understanding of the role of men women, youths in fish feed development, access and utilization. The survey will therefore profile producers, importers, ingredient suppliers, their capacity and needs in a gender disaggregated manner including environmental aspects. The survey will be conducted by a team of socio-economists as well as technical persons in aquaculture. As a measure to improve quality, capacity gap analysis for the existing laboratories to monitor and certify feed production quality will be carried out. The results of the baseline survey will be available by the third month of the project and will inform the subsequent activities and phases of the project.

The next activity will be to develop BMPs for fish feeds industry and for improving aquaculture production. Review and reference to literature will be made about the best practices nationally, regional and globally. The BMPs will cover aspects of quality in production and storage, distribution and usage as well as creating capacity among stakeholders to identify good quality fish feed ingredients and feeds. Dissemination materials will be produced and packaged in a user-friendly and gender responsive manner for the different stakeholders along the feed value chain. Guidelines to ensure safety and quality of feed for various actors along the value chain will also be developed and disseminated.

The team will first identify the various stakeholders (producers, importers, ingredient suppliers, Pos, SMEs, smallholder fish farmers and other stakeholders) in the fish feed industry as well as their training needs then organize trainings for them in the developed BMPs; feed production and development of profitable and sustainable business plans for fish feeds production that can be funded. They will also be trained in the use of developed mechanisms and procedures for feed analyses; on UNBS and international standards & compliance; in feed formulations and feeds production technologies; in mechanisms for data collection for water quality monitoring in aquaculture production systems; record and data systems on quality and quantities of fish feeds manufactured, distributed and utilized, in how to access information and use the developed social platforms – for all these trainings, materials will be developed and pre-tested to make sure that there are easily understood by the target groups. The different stakeholders will be mobilised in different groups according to regions – Northern, North western, Eastern, Central, South western, and Western. All trainings will be hands-on complemented with audio-visual aids and where possible, the trainings shall include demonstrations. Development of fish feed development will commence in February 2020 and completed in May 2020, while associated training will be carried out between January and May 2020 and this will be lead by Dr. Mathew Mwanja, Dr. Mujibu Nkambo and Dr. Cassius Aruho.

The team will develop a list of locally available cost effective non- conventional feed ingredients, and formulae, and build capacity of fish feed producers, lead farmers (including women and youth) as well as extension workers in use of the new technologies. This will be carried out through hands-on training workshops and demonstrations during from May to August 2020.

This action will prepare a policy brief on the required changes in regulatory and policy framework to support the designed BMP for feed ingredients, feed production, and distribution and on farm feed management practices. In order to improve feed availability and reliability, the action will develop and promote alternative effective and reliable feed distribution channels and linkages. This will be done in coordination with lot 1 actions and will be led by ECRAM and will be undertaken from February to August 2020.

The action will develop guidelines for BMPs on central fish feed data collection and management, create digital media platforms (Mobile Application) to access and exchange information on fish feed



and markets in conjunction with PESCA lot 2. Local and international fish feed standards will be popularised among the fish feed value chain actors.

As a measure of ensuring environmental safety and sustainability, the action will also develop and disseminate environment management guidelines on feed and feed management for farmers, SMEs, distributors and commercial producers. The team will finally gather, package and disseminate information on fish feed in various forms to all the stakeholders and beneficiaries.

### **3.1 Inception Activity**

An inception meeting will be held in the first month of the project to bring together the implementers and some other stakeholders to further understand the conceptual framework and project implementation process. Each component of the proposal will be thoroughly discussed detailing how, where and when the activities will be implemented and outputs clearly defined. The tools for the proposed methodologies will be developed, pre tested and adopted

### **3.2 Project Management**

The Lead applicant is Eccelenzia Consorzio Research and Management (ECRAM) working with 05 co-applicants including – NARO (NARO-KARDC); Aquafarm Consults Ltd; Nalubowa-Lusembo & Company Estates Ltd; Chemiphar (U) Ltd; and Owan Mwan Aquaculture Limited (OMAL).

The team will work with selected associates including existing fish feed factories; existing fish feed ingredients producers and suppliers; Asian Institute of Technology for Aquaculture (AIT); Senya Fish Farm; MUSO4 Ltd; Aquafarm fish farm; Lira Integrated Fish Farm; Nassenyi Fish Farm; Kikota Fish Farm and Bamukwasi Fish Farm. Gudula Leisure farm to offer specialised and experienced experts to offer short-term technical assistance.

ECRAM will be responsible for the overall implementation of the action including the use of funds transferred to the five (05) implementing co-applicants/partners involved in the implementation. While implementing this action, ECRAM will adhere to the following core principles of management; efficiency, transparency, diligence, accountability, mutual respect, gender inclusiveness, and synergism in line with the principle of sound financial management as well as the best practices in the field concerned. ECRAM will carry out the following;- budget-implementation tasks, Recruitment of implementing teams, Technical Assistance, procurement of supplies, awarding, signing and managing contracts, doing payments and recoveries, and visibility activities.

The Government of Uganda, through MAAIF with close collaboration of the MoFPED will be responsible for supervising the action to enhance ownership of the action. These will conduct at least 4 annual reviews at a regularly scheduled meeting of Action Coordinating Committee (ACC). The ACC will ensure overall monitoring, evaluation, review progress and work plans and provide guidance as required. The planning processes, work plans and results of the action will be harmonized with the action objectives as defined in the action documents and other subsequent complementary legal commitments. The Project Management Unit (PMU) in MAAIF will oversee set project performance. The action Technical Coordination Unit (TCU) will be established headed by the Action Principal investigator (PI) supported by the project coordinator (PC) to ensure successful implementation of the action. These will closely work with selected District Fisheries Officers for effective implementation of the action. Technical backstopping services will be provided by the AIT expert in conjunction with a competent team from NARO (NaFIRRI – NARO-NARO-KARDC). TCU will be responsible for developing yearly work plans of all the action activities and budgets, overall coordination and management of the action work plan and channelling the inputs to the activities and ensuring effective and timely feedback. The members of the TCU will be re-oriented on gender equality competencies to ensure that work plans are gender responsive. Overall, there will be a Project Steering Committee made up of one person nominated by each of the six implementing partners. The PSC set up and modality of operation shall be agreed upon in the first meeting. The PSC will be responsible for review and policy guidance on the planned activities and expenditure. All staff attached to the action will have clearly defined ToRs highlighting their level of engagement and expectations. ECRAM will also facilitate the implementation of the action, procurement of equipment, project evaluation and audit in accordance with the Government of Uganda rules and procedures and the funders (EU) policies. Annual progressive reports will be prepared by ECRAM highlighting key achievements and

milestones of the entire consortium. An inception report will be submitted after 6 months of the start of the implementation period. Brief progress summaries will be prepared by ECRAM every 3 months for internal review purposes only and shared with the PMU, MAAIF, MFPED and EU upon request. The above-mentioned reports will be compiled by ECRAM and subject to clearance by the ACC..

### 3.3 Planned Activities:

#### 1) **Assessment of current fish feeds status (production and utilization) in the country:**

This activity will commence with an in-depth review and analysis of technical, scientific, management and any other available information and data on the different elements of feeds industry in Uganda. This will be carried out over the first week of implementation, and will be followed by conducting of technical consultations with national aquaculture sector managers and representative key feeds industry actors over a period of 2 weeks. This will form the basis for preparation of inception report, action implementation plan, and elaboration of the workplan as well development of tools for the action.

**2) Review of the Aquaculture Feed Regulatory and Policy Framework:** This action will involve in-depth review of policies, laws, regulations, guidelines and standards for aquaculture feed sector; field visits and assessments of feed analyses laboratories in the country; technical consultations with political leaders, sector technical managers, feed industry, fish farmers and aquaculture specialists using checklists and interview guides as well as focus group discussions at different levels as to the required changes in feed sector management. The activity will also include assessing how the regulatory and policy framework addresses the gender concerns in the feed value chain and supports enrolment of women and youth in the feed value chain.

**3) Devising of Alternative Cost-effective Feed Distribution Channels:** This activity will involve survey and assessment of existing feed distribution channels in terms of location and source of feed, number of intermediaries, distribution of profit along the channel, logistics in distribution, cost of marketing and advertising, and level of expertise and skills in feed quality and safety assurance & control. The survey will also assess the delivery time, place & ownership of utility provided by different channels for different types and locations of fish producers.

**4) Building capacity in feed utilisation and feeding records at producer and farm level:** Records and data systems in the production chain are kept for various purposes including - for historical purposes; productivity assessment at production level both at the industry (manufacturers-yields resulting from the raw materials (ingredient type and quality used)), and at the farm, (fish yields resulting from the different feed types under different production systems i.e. growth performance (FCR of the feed); production cost and profitability assessment for manufacturers (cost of ingredients, labour, power and other production costs), distributors (distribution and storage costs from the factory to the farm) and farmers (feed volumes procured and their costs, storage and feed application records); for traceability purpose along the value chain, reliable data must be maintained at all levels namely; at the source of ingredients, transportation, point of production, storage, distribution and eventual utilization at the farm. This activity will involve review and in-depth analysis of existing feed management and records practices at 60 “emerging commercial” and 60 “smallholder” aquaculture farms in the six regions (20 farm units in each region); assess the feed utilization and reporting of data and information at the 60 farms as well as the capacity to manage and utilize data at these farms; devising of model records and data collection systems and mechanisms for feed management and utilization on these farms; assessing data and records management practices for fish feed manufacture, distribution and utilization of 30 feed manufacturing establishments including 4 major commercial producers, 12 small-scale producers (2 from each region) and 12 on-farm feed producers (2 from each region) and 12 feed distributors (2 intermediaries from each region).

**5) Developing of a central data feed production, utilization & records management system:** According to Lukuyu et al., (2013) there is a high level of informality and poor coordination in the animal feeds industry across the East African region, which leads to supply of poor-quality feeds ingredients and finished animal feeds. Using the findings in section 1.1.7.8 above, this activity will devise model public feed production, distribution and data collection, analysis and management systems that will organise the collection of field data for input to the sectoral central information

system to be used by especially the resource managers (DAMD) to assess trends within the industry country wide and design the necessary interventions by MAAIF. This activity will also involve training and demonstration of use of BMPs in gender disaggregated data collection methods to SMEs feed producers, fish farmers, their POs and other stakeholders – emphasizing user practical friendly data collection methods and records keeping while making the methods more organized or official. Working with PESCA Lot 1, the implementing team will develop guidelines on fish feeds quality assurance and control for fish feed producers and suppliers. In addition, the implementing team will mobilise local fish feed producers and POs to come up with self-regulatory framework for quality assurance, self-audit and good fish feed manufacturing practices. This activity will be led by OMAL, a co-applicant that has experience working with FAO in organising smallholder farmers in data collection and record maintenance and linking them to the resource managers, OMAL will be assisted by NARO-KARDC who have worked with a number of the local commercial feed producers in the country. The output of this activity shall be collaborated with PESCA Lot 2

**6) Establishing a model Feed Production and Distribution Digital Platform:** Digital information is receiving much attention in the developing world because the infrastructure has greatly improved with access to internet and mobile phone services. Uganda has a population of about 40 million with approximately 24.8 million people (70.9%) accessing internet services largely through their mobile phones or computers (National Information Technology Authority Uganda report 2017/2018). This development has greatly improved and cascaded information flow to some specific sectors such as tourism, health and agriculture (particularly coffee and tea marketing). . In order to make quality feeds availability and feeds acquisition channels known to especially the smallholder farmers and the vulnerable gender women and youth at the grass roots, this activity will work with PESCA Lot 2 implementing team to develop user friendly social media platforms (Mobile Application) to assist producer organisations (POs) access updated and real time information about fish feeds and feed management. In addition, these platforms will enable users to access and exchange information on feed issues such as feeds availability, feed price, distribution channel and other aquaculture information such as markets, generated technologies and other inputs.

**7) Feed standards development and capacity building:** In order to improve market acceptability and to have increased and expanded market access including local, regional and international markets, the implementing team working with the UNBS will mobilise, sensitise and train local SMEs, ingredient suppliers, smallholder fish farmers and other stakeholders on local (UNBS) and international standards & compliance. This will be done through consultative meeting of the implementing team to un-pack and explain the UNBS and international standards in animal/fish feeds production; training and demonstrating to SMEs in feed production to be compliant to UNBS and international standards for animal feed production; and to develop and promote self-monitoring guidelines for compliance to the required standards. This activity will be led by AFC with long experience in standards maintenance.

**8) Monitoring effects of fish feeds on environment:** To counter use of rudimentary technologies in feeding of farmed Nile tilapia and the African catfish in addition to promotion, training, and demonstration of BMPs in aquaculture, the implementing team will devise mechanisms for monitoring and reporting effect of fish feeds use on environment and mitigation measures to allow for increased commercial aquaculture productivity and production in an environmentally sustainable way. This will be done through developing user friendly gender responsive mechanisms for environmental monitoring where fish feeds are being used and reporting to appropriate authorities for mitigation; mobilising, sensitising, training and demonstrating to POs and other stakeholders dangers of environmental mismanagement and mechanisms for data collection of water quality parameters that can be used to detect environment deterioration; and to create awareness on and launch a campaign against the use of sub-standard feeds. NARO-KARDC which has been leading the activities of mapping aquaculture production sites, and suitability assessment of aquaculture production systems for both private and public organisations will lead in monitoring effects of fish feed on the environment will lead.

**9) Production of information packages standards:** For uptake, sustainability and continued research into different interventions and areas tackled under this study for the increased commercial aquaculture productivity and production, the implementing team will package all fish feed information gathered in various forms and disseminate to all the stakeholders and beneficiaries in line with the funders – EU policies. The implementing team will endeavour to make sure that the smallholder farmers and vulnerable gender – youth and women can easily access this information when and wherever they need it for increased commercial and environmentally sustainable aquaculture production. The action will involve packaging the available information from all study activities above in various forms including flyers, brochures, manuals, articles, banners, poster and blogs etc. and updating the developed freely accessible social media platforms; disseminating the gathered information through trainings, workshops, publications, famers agricultural shows, symposiums and mobile app updates; and use of talk shows on radios/TVs and articles in local newspapers. NLE one of Uganda’s leading farmer to farmer technical service provider known to most actors in the feed value chain will lead this activity.

### 3.4 Alignment of Project Objectives, Tasks/Activities and Outputs

Objectives	Activity	Deliverable	Lead Partner
1) Put in place a workable implementation programme, management and implementing team, and effective coordination	<b>1) Inception activities</b> <ul style="list-style-type: none"> <li>• Mobilize and organizing for project implementation</li> <li>• Conducting consultations with Client, EU and MAAIF</li> <li>• Elaborate the work plan and schedule of implementation of the project activities</li> </ul>	<b>1) Inception report prepared, presented, revised and submitted</b> <ul style="list-style-type: none"> <li>(i) presentation of inception report</li> </ul>	ECRAM
2) To generate baseline information base against which to monitor and assess progress and effectiveness of implementation of the planned Action and the impact of the Action.	<b>2) Conduct Baseline study:</b> <ul style="list-style-type: none"> <li>• Conduct a needs assessment for improving output, quality and reliability of feed in Uganda</li> <li>• Profile local fish feeds producers, importers, ingredient suppliers and fish feeds utilization by fish farmers</li> <li>• Assess current fish feeds status (production and utilization) in the country</li> <li>• Assess the existing laboratory capacity for analysis of feed and feed ingredients</li> <li>• Determine the demand for fish feed, source and types of feed, challenges to feed utilization, feed production, ingredient production, ingredient supply</li> <li>• Identify and mobilize feed ingredient suppliers (including women and youth)</li> <li>• Identify and mobilize feed producers (large scale and SME)</li> <li>• Presentation and sharing of baseline study outcomes</li> </ul>	<b>2) Baseline Report prepared, presented, revised and submitted:</b> <ul style="list-style-type: none"> <li>• Current local fish feed production status including volume, actors, and ingredient sources profiled including the needs and capacities of actors established.</li> <li>• Profile of existing producers and ingredients suppliers in terms of processing capacity, storage, mechanisation and automation, installed capacity, owners, managerial skills, technical skills, marketers and other actors; and needs and capacities of actors established</li> <li>• One (01) comprehensive Baseline Report prepared, presented, and produced.</li> </ul>	KARDC
3) Evaluate current fish feed utilization, fish feeding regimes and practices, and recommend ways to reduce feed wastage and improve feeding efficiencies	<b>3) Conduct field observations and assessments of selected producers in terms of fish feed management practices</b> <ul style="list-style-type: none"> <li>• Fish farm visits and assessments of feed management practices</li> <li>• Conduct interviews of the fish farm owners and managers on feed management practices</li> </ul>	<b>3) Guidelines for on-farm feed and feed waste management practices produced.</b> <ul style="list-style-type: none"> <li>• One (01) set of guidelines prepared and produced.</li> </ul>	NLE

	<ul style="list-style-type: none"> <li>• Conduct technical consultations with scientists and technical experts on feed and feed management practices</li> <li>• Develop guidelines for enhancing on-farm feed management practices including feed waste and environment management</li> </ul>		
4) Identify the major issues for optimization of fish feeds and feed additives	<p><b>4) Conduct technical assessment and evaluation of feeds and feeds additives locally available on the market.</b></p> <ul style="list-style-type: none"> <li>• Conduct proximate analysis of feeds available on the market</li> <li>• Conduct physical examination of feed additives on the market in terms of quality, origin, suppliers and volumes</li> <li>• Conduct feed protein energy optimization trials for Nile tilapia working with selected farmers in six regions</li> <li>• Conduct on-farm trials for optimisation of application of digestive/metabolic enhancers for different stages of Nile tilapia.</li> <li>• Advise on required additives for making established fish feed formulae</li> </ul>	<p><b>4) Guidelines for optimization of fish feeds and feed additives for Nile tilapia</b></p> <ul style="list-style-type: none"> <li>• One (01) set of guidelines on cost effective ways for optimization Nile tilapia feed for different stages of fish.</li> <li>• One (01) set of guidelines for improving feed cost-efficiency and optimal levels of digestive/metabolic enhancers for Nile tilapia</li> <li>• One (01) list of locally available feed additives and price, level of applicability and usability prepared and developed.</li> <li>• Ten (10) high potential locally available non-commercial feed additives identified and their usability and commercialization potential established</li> </ul>	KARDC
5) Ascertain availability, abundance and quality of alternative locally available feed ingredients and develop formulae for cost effective production of fish feeds	<p><b>5) Conduct field surveys for non-conventional locally available ingredients and conduct laboratory analyses for key nutrients of the ingredients</b></p> <ul style="list-style-type: none"> <li>• Literature review</li> <li>• Field survey</li> <li>• Laboratory analyses</li> <li>• Developing of six formulae using ingredients with the highest potential.</li> </ul>	<p><b>5) A Technical paper on non-conventional fish feed ingredients in Uganda, and six formulae for those with most potential.</b></p> <ul style="list-style-type: none"> <li>• One (01) list of at least (20) locally available and non-conventional feed ingredients prepared and produced</li> <li>• Six (06) formulae based on use of non-conventional ingredients, developed</li> <li>• Thirty (30) person including 12 fish feed producers, 12 lead farmers (including women and youth) and 6 extension workers trained in use of the new technologies</li> </ul>	Chemiphar
6) Assess the research and	<b>6) Conduct technical consultations on research needs,</b>	<b>6) Technical paper and policy brief on</b>	ECRAM

development needs for better fish feed formulation, manufacture, storage, transportation, utilization, gender and environment responsiveness	<p><b>capacity, and key issues for feeds development in Uganda</b></p> <ul style="list-style-type: none"> <li>• Conduct consultations with lead farmers, feed producers, feed distributors, technical managers and research institutions</li> <li>• Conduct environment and gender survey in regards to production, accessibility to feed, and utilization of feeds</li> </ul>	<p><b>research and development needs for improved quality and availability of feed</b></p>	
7) Review and devise appropriate fish feeds distribution channels including proactive linkages amongst feed producers and fish farmers.	<p><b>7) Survey and assess effectiveness of existing feed distribution channels</b> in terms of location and source of feed, number of intermediaries, distribution of profit along the channel, logistics in distribution, cost of marketing and advertising, and level of expertise and skills in feed quality and safety assurance &amp; control.</p> <ul style="list-style-type: none"> <li>• Organize dialogue meetings and consultations on cost-effective options of ingredient supply and feed distribution channels among feed producers, ingredient producers, feed distributors, feed stockists, POs, and lead farmers</li> </ul>	<p><b>7) Alternative effective and reliable feed distribution channels and linkages defined and made known to POs</b></p> <ul style="list-style-type: none"> <li>• One (01) policy paper on alternative effective and reliable feed distribution channels and linkages</li> </ul>	OMAL
8) Develop alternative systems for sourcing, quality control and supply of fish feed ingredients to the fish feed production industry	<p><b>8) Conduct field surveys and consultations on existing ingredients sourcing, processing, transportation and delivery systems</b></p> <ul style="list-style-type: none"> <li>• Identify and mobilize feed ingredient suppliers</li> <li>• Engage and facilitate the dialogue between ingredient suppliers and feed producers</li> <li>• Train ingredient suppliers in business skills including building of their contractual relations capacity through training.</li> <li>• Training suppliers on BMPs in proper ingredient sourcing and handling</li> <li>• Linking ingredient suppliers to feed production SMEs</li> <li>• Identify, mobilize and train some selected PO crop farmers on BMPs for feed ingredients production and handling to be linked to supplier SMEs</li> <li>• Develop guidelines for safety and quality control of the feed value chain processes and activities</li> </ul>	<p><b>8) Guidelines to ensure safety and quality of feed for various actors along the value chain developed and disseminated</b></p> <ul style="list-style-type: none"> <li>• Twenty four (18) feed ingredient dealers (3 from each of the six regions), identified and trained in sourcing, processing, quality control, and transport of ingredients for fish feeds and in effective contractual linkage to feed producers.</li> <li>• One (01) set of guidelines on ensuring safety and quality of feed by various actors along the value chain developed and disseminated</li> </ul>	OMAL

<p>9) Enhance stakeholders knowledge of BMPs in fish feed production and management, and environment management</p>	<p>9) Engage and work with an international expert in developing of BMPs for key processes and activities in the fish feed value chain</p> <ul style="list-style-type: none"> <li>• Conduct an in-depth literature review and consultations with key stakeholders</li> <li>• Engage International Expert for Technical assistance in developing BMPs</li> <li>• Workshop to develop BMPs for management of ingredients, feed production</li> <li>• Conduct current sources and modular analysis of alternative options for energy sources for feed producer SMEs</li> <li>• Cost effective and environment sustainability of different energy sources used in feed production established and appropriate cost effective models based on alternative energy sources developed for use by SMEs</li> </ul>	<p><b>9) BMPs that are gender &amp; environment responsive on ingredients, feed production &amp; alternative energy sources developed and disseminated to farmers, POs, SMEs, feed producers, ingredient suppliers and other stake holders trained on the BMPs</b></p> <ul style="list-style-type: none"> <li>• One (01) set of guidelines for BMPs adoption and implementation in the field value chain developed</li> <li>• One (01) technical paper on Model cost-effective and reliable options for energy sources and supply for use by feed production SMEs developed</li> </ul>	<p>AFC</p>
<p>10) Investigate the technical, economic and policy constraints related to the production of quality aquafeeds.</p>	<p>10) Review of the Aquaculture Feed Regulatory and Policy Framework</p> <ul style="list-style-type: none"> <li>• Conduct technical and policy consultations with representative key stakeholders of feed value chain</li> <li>• Hold a technical workshop on required regulatory changes and policy gaps for improvements in production, distribution and on-farm feed management practices</li> </ul>	<p><b>10) Policy brief on the required changes in regulatory and policy framework to support the designed BMP for feed ingredients, feed production, distribution and on farm feed management practices.</b></p> <ul style="list-style-type: none"> <li>• One (01) policy brief prepared and produced on required regulatory and policy changes</li> </ul>	<p>ECRAM</p>
<p>11) Identify the support services that are needed to build the capacity of SMEs aqua feed producers to enable them to improve the technical efficiency of their production processes</p>	<p><b>11) Engage and assess the required support technical and business support services needed to improve feed management at producer and farmer levels.</b></p> <ul style="list-style-type: none"> <li>• Conduct an assessment of the capacity of existing service providers in the feed production and utilization value chains</li> <li>• Conduct consultation and training workshops on capacity gaps and requirements for effective service provision in feeds utilization and feeding records management</li> </ul>	<p>11) Capacity of service providers in guidance of feed utilisation and feeding records management at feed producer and farm levels developed.</p> <ul style="list-style-type: none"> <li>• 20 service providers trained in feed utilization and feeding records management</li> <li>• 12 SME feed producers' technical and business managers trained in feeds records and feeds distribution records management</li> </ul>	<p>AFC</p>
<p>12) Increase the involvement</p>	<p><b>12) Engage key actors in the feed value chain (producers,</b></p>	<p><b>12) Develop 1 policy brief on increasing</b></p>	<p>OMAL</p>



<p>of women and youth in the production, distribution, utilization of fish feeds through mobilisation, sensation, exposure and training</p>	<p><b>distributors, stockists and technical managers) and women and youth leaders of POs and devise means for increasing involvement of women and youth in the feed value chain processes and activities</b></p> <ul style="list-style-type: none"> <li>• Conduct 1 consultative workshop for 30 persons on review of the recommended actions for increasing women and youth involvement in feed value chain.</li> </ul>	<p><b>women and youth involvement in feed value chain</b></p> <ul style="list-style-type: none"> <li>• One (01) workshop conducted on involvement of women and youth in feed value chain</li> </ul>	
<p>13) Develop information packages for investment in fish feed production and marketing industry</p>	<p><b>13)Developing of a central data feed production, utilization &amp; records management system</b></p> <ul style="list-style-type: none"> <li>• Establishing a model Feed Production and Distribution Digital Platform</li> <li>• Develop and train feed value chain actors in use of digital and social media platforms (mobile apps) to access and exchange information on feed issues and markets in conjunction with PESCA lot 2</li> <li>•</li> <li>• Gather, evaluate, package and disseminate fish feed information</li> <li>• Develop and produce information packages for investment in fish feed production and marketing industry.</li> </ul>	<p><b>13) A feeds management and user data system developed and operationalized.</b></p> <ul style="list-style-type: none"> <li>• At least two (02) Digital media platforms (Mobile Application) to access and exchange information on fish feed and markets developed</li> <li>• One (01) Record and data set on quality and quantities of fish feeds manufactured, distributed and utilized developed and prepared and produced.</li> <li>• One (01) set of guidelines for BMPs on central fish feed data collection and management developed</li> <li>• One (01) central fish feed data collection and management platform developed and operationalised</li> </ul>	<p>AFC</p>
<p><b>14)</b> To develop feed standards and build capacity of feed value chain actors to integrate and use standards in feed value chain processes and activities.</p>	<p><b>14)</b> Conduct search, analysis and simplification for adoption the applicable standards in the feed value chain.</p> <ul style="list-style-type: none"> <li>• Search, breakdown and promotion of local and international fish feed standards</li> <li>• Create, produce and disseminate information packages on feed and feed ingredient standards</li> <li>• Conduct a training workshop on standards and their applicability and use for actors in feed value chain</li> </ul>	<p><b>14)Local and international fish feed standards promoted and popularised among the fish feed value chain actors, and made accessible and usable</b></p> <ul style="list-style-type: none"> <li>• At least twelve (12) standards identified and popularized for feed producers and ingredient suppliers</li> <li>• One (01) workshop of 30 persons including 12 feed producers, 12 ingredient suppliers and 6 extension workers trained in</li> </ul>	<p>ECRAM</p>

		applicability of identified standards in feed value chain.	
15) To assess existing laboratory feed analysis capacity and develop user friendly mechanisms for feed analyses for SMEs	<p><b>15) Build on-farm feed and ingredient analytical capacity</b></p> <ul style="list-style-type: none"> <li>• Conduct survey of existing fish feed analytical capacity in Uganda</li> <li>• Conduct a consultative workshop on options and mechanisms and procedures for on-farm feed and ingredient analyses</li> </ul>	<p>15) The capacity of analysis of feed and feed ingredients developed.</p> <ul style="list-style-type: none"> <li>• Existing laboratory feed analysis capacity established</li> <li>• Approaches and mechanisms for user friendly feed analysis devised and popularised</li> </ul>	KARDC
16) To assess the environmental impacts in fish feed sector and evaluate the environment management of the impacts, as well as design improved generic EMPs for various actors along the feed value chain	<p><b>16) Conduct environment impact study and evaluate the performance of existing EMPs within the feed value chain.</b></p>	<p>16) Environment management guidelines on feed and generic management plans developed for farmers, SMEs, distributors and commercial producers developed, and disseminated.</p> <ul style="list-style-type: none"> <li>• One (01) set of environment management guidelines produced for different actors in feed value chain.</li> <li>• One (01) set of generic environment management plans for each of the following groups prepared and produced: <ul style="list-style-type: none"> <li>○ Feed ingredient producers and processors;</li> <li>○ Feed producers,</li> <li>○ Commercial farmers; and</li> <li>○ Smallholder farmers produced.</li> </ul> </li> </ul>	ECRAM
17) Increase availability and accessibility of action results and outputs.	<p><b>17) Put in place a system for increasing availability and accessibility of action results and outputs for the target beneficiaries</b></p> <ul style="list-style-type: none"> <li>• Establish an evidence-based approach to monitoring and evaluation of all agreed results</li> <li>• Organize consultative workshops every six months to share results</li> <li>• Prepare different media including electronic, radio, TV, on-</li> </ul>	<p>17) Key results, outputs and outcomes of the Action popularized and made available for intended users.</p> <ul style="list-style-type: none"> <li>• Develop a result-oriented monitoring framework to monitor on progress and outputs of all key actions</li> <li>• Set up at least three (03) webpages on ECRAM website for dissemination of action</li> </ul>	ECRAM

	farm demos and others for dissemination of key outputs of action.	outputs and results <ul style="list-style-type: none"> <li>• Conduct at least three (03) workshops for dissemination of Action results</li> <li>• Hold at least six (06) radio talk shows, two (02) TV presentations, six (06) on-farm demos; five hundred (500) factsheets and brochures on action results.</li> </ul>	
--	---	---	--

### 3.5 Visibility and communication strategy

The implementing team will upload a brief description of the project on ECRAM and co-applicants websites. The Project Management Committee (PMC) will upload all achieved milestones and outcomes of major meetings – inception, mid-term and final meetings of the project on our websites of the Lead Applicant and Co-applicants. All project sites will have signposts with EU and Uganda, ECRAM and co-applicants logos describing the funder and activities being handled at these different sites. All movable and static equipment, vehicles, buildings will be embalmed with EU and Uganda, ECRAM and co-applicants logos brief description of the project. During workshops and meetings under this project, poster describing the project and having EU and Uganda, ECRAM and co-applicants logos will be put up in/at the venue. At talk shows, interviews, documentaries and articles about the project for all media both print and electronic media will mention EU as the sponsor and where possible include the logos of EU and Uganda, ECRAM and co-applicants and the project description or title. All publications including – peer reviewed journal articles, brochures, flyers, manuals will all have an acknowledgement of the EU as the funders and where possible an inscription of logos of both implementing partner's team and the EU with the title of the project. In all the above communication and visibility activities the project PMC will do it in a corporate manner in order to enhance the effectiveness. At the inception meeting, the team will develop a more elaborate communication strategy between the EU, team members and the all stakeholders. The list of targeted stakeholders and audiences will be developed at the inception meeting, which will include all target groups and the final beneficiaries. All project interventions and its deliverables will emphasis the cross cutting issues of gender, HIV and environment. The team will develop and implement a communication plan guided by the EU and GoU guidelines to ensure proper and timely coordination of project activities and all the stakeholders.

## 4 WORKPLAN

See the table below for the workplan for the planned activities.

### 4.1 Deliverables-

#### 3.1.1. Main Deliverables

1. Fish feed production status including volume, actors, ingredient sources, alternative energy sources and feed laboratories profiled including the needs and capacities of actors established.
2. A list of locally available cost effective non - conventional feed ingredients, Six (06) formulae developed and capacity of fish feed producers, lead farmers (including women and youths) and extension workers in use of the new technologies built.
3. BMPs that are gender and environmental responsive on ingredients, feed production and its management developed (ingredient sourcing, handling, processing, transportation etc.) and POs, SMEs, Feed producers, ingredient suppliers and other stakeholders trained on BMPs.
4. Guidelines to ensure safety and quality of feed for various actors along the value chain developed and disseminated
5. Policy briefs on the required changes in regulatory and policy framework to support the designed BMPs for feed ingredients, feed production, distribution and on farm feed management practices
6. A policy paper on alternative effective and reliable feed distribution channels and linkages made known to POs
7. Record and data sets on quality and quantities of fish feeds manufactured, distributed and utilized developed and promoted
8. Guidelines for BMPs on central fish feed data collection and management developed
9. Digital media platforms (Mobile Application) to access and exchange information on fish feed and markets developed in conjunction with PESCA lot 2
10. Local and international fish feed standards popularised among the fish feed value chain actors
11. Environment management guidelines on feed and feed management for farmers, SMEs, distributors and commercial producers developed, and disseminated
12. Fish feed information gathered and packaged in various forms and disseminated to all the stakeholders and beneficiaries.

## 4.2 Workplan and Time table

Activities	Lead partner	Inception		Implementation																								
		019	2020											2021														
		Month	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N		
			E	A	E	A	P	A	U	U	U	E	C	O	E	A	E	A	P	A	U	U	U	E	C	O		
No.mnths	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	0	21	22	23	24				
<b>1.0 INCEPTION PHASE</b>																												
1.1. Logistics	ECRAM,																											
1.2. EU and Partners' Implementation meetings																												
1.3. Drafting Inception Report																												
1.4. Inception Report workshop with stakeholders																												
1.5. Writing a final inception report																												
1.6. Submission of an Inception Report to NOA																												
<b>2.0 ACTIVITY 1: NEEDS ASSESSMENT AND PROFILING OF AQUACULTURE FEED VALUE CHAIN ACTORS e.g. PRODUCERS, MANUFACTURERS, IMPORTERS, INGREDIENT SUPPLIERS, LABORATORIES</b>																												
2.1. Conduct a baseline survey																												
2.1. Designing a data collection tool	KARDC																											
2.1.1. Pretesting and fine-tuning the tool																												
2.1.2. Selection, recruitment and training of research assistants/enumerators																												
2.1.3. Review aquaculture feed regulatory and policy framework																												
2.1.4. Data collection																												
2.1.5. Data entry analyses																												
2.1.6. Report writing																												
2.1.7. Meeting to internalize and adopt the report																												
2.1.8. Workshop to disseminate report findings with relevant stakeholders																												
<b>3.0. ACTIVITY 2: DEVELOPMENT OF BMPs ON INGREDIENTS, FEED PRODUCTION &amp; FEED MANAGEMENT AND ALTERNATIVE ENERGY SOURCES ANALYSIS</b>																												
<b>3.1. Development of BMPs for the fish feed value chain</b>																												
3.1.1. Workshop to develop BMPs for management of ingredients, feed production	AFC																											
3.1.2. International Expert Technical assistance in developing BMPs																												
3.1.3. Training of fish feed value chain actors on the developed BMPs.																												
3.1.4. Modular analysis of options for energy sources for feed producers																												

4.0. ACTIVITY 3: CAPACITY BUILDING OF LOCAL SMES IN FEED QUALITY CONTROL AND ASSURANCE ALONG THE FEED VALUE CHAIN AND ASSESSMENT OF OPTIONS FOR DEVELOPMENT FEEDS ANALYTICAL CAPACITY IN UGANDA																				
<b>4.1. Capacity building of feed producers and ingredient suppliers.</b>																				
4.1.1. Development of guidelines to ensure safety and quality of feeds	NLE																			
4.1.2. Packaging information and training feed production SMEs, POs and other stakeholders on using quality control and assurance guidelines																				
4.1.3. Training feed production SMEs, POs, and other stakeholders in quality control and assurance of feed production and marketing value chain																				
4.1.4. Assess capacity for laboratory analysis of feeds	ECRAM																			
4.1.5. Demonstrate use of portable proximate analysis machines																				
<b>5. ACTIVITY 4: DEVELOPING A LIST OF LOCALLY PRODUCED NON-CONVENTIONAL FEED INGREDIENTS</b>																				
5.1. Collection of samples of ingredients	Chemiphar, NARO- KARDC																			
5.2. Sample quality validation and analysis																				
5.3. Workshop for disseminating the results																				
<b>6. ACTIVITY 5: SMES IN FEED PRODUCTION &amp; INGREDIENT SUPPLIERS TRAINED ON UNBS AND INTERNATIONAL STANDARDS &amp; COMPLIANCE.</b>																				
6.1. Workshop to review and harmonise local and international standards for fish feed production	AFC																			
6.2. Workshop to develop Code of Practices (COPs) for feed ingredients supply.																				
6.3. Training and linking feed production SMEs and ingredient suppliers for business																				
<b>7. ACTIVITY 6: DEVELOPING USER FRIENDLY MECHANISMS FOR FEED ANALYSES FOR SMES</b>																				
7.1. Assess existing ingredients and feed analytical capacity	KARDC																			
7.2. Build on-farm feed analytical capacity																				
7.3. Workshop to develop mechanisms and procedures for on-farm feed analyses																				
7.4. Training and demonstrating the use of use of feed analytical tools																				
<b>8. ACTIVITY 7: FEED INGREDIENT DEALERS, IDENTIFIED AND TRAINED IN SOURCING INGREDIENTS FOR FISH FEEDS AND LINKED TO FEED PRODUCERS/MANUFACTURES</b>																				
8.1. Identify and mobilize feed ingredient suppliers	OMAL																			
8.2. Training suppliers on BMPs in proper ingredient sourcing and handling																				
8.3. Linking ingredient suppliers to feed production SMEs																				
8.4. Identify, mobilize and train some selected PO crop farmers on BMPs for feed ingredients production and handling to be linked to supplier SMEs																				
8.5. Encouraging and linkages of large crop farmers to local fish feed producers for possible contract farming for feed ingredients within the POs																				
<b>9. ACTIVITY 8: FEED PRODUCTION TECHNOLOGIES &amp; FORMULATIONS AND ENVIRONMENT MANAGEMENT FOR FISH FEEDS AVAILLED TO SMES FEED PRODUCERS</b>																				







### 4.3 Log frame/ M&E plan

	<b>Results chain</b>	<b>Indicator</b>	<b>Baseline (Base year 2019)</b>	<b>Target (2021 reference year)</b>	<b>Current value (Base year 2019)</b>	<b>Source and means of verification</b>	<b>Assumptions</b>
						<b>-Period of verification (quarterly /after 3 months)</b>  <b>- Verification to be made by the auditors, the M&amp;E officers; EU; implementation team</b>	
<b>Impact (Overall objective)</b>	Increased incomes and better livelihoods from increased fish production and productivity due to enhanced output and utilization of industrially and on-farm produced complete feed in Uganda	-quantity of farmed fish produced  -increased house hold incomes for smallholder farmers-return on investment	-recorded production is 120,000 (FAO, 2018)  0.69 (Kasozi et al., 2014)	-250,000 t  1.3	-120000 t (FAO, 2018)  0.69 (Kasozi et al., 2014)	-Progress reports -MAAIF data -UBOS statistics -Baseline report	Not Applicable
<b>Outcome (s) (Specific objective(s))</b>	1. Increased fish productivity and production in the country	-quantity of feed produced  -Productivity - kg/m <sup>3</sup>  -quantity of farmed fish produced  -percentage of smallholder using supplementary feeds farmers	88,000 tonnes of feed (FAO Smartfish report, 2017)  0.7 kg/m <sup>3</sup> (Kilimo-FIEFOC, 2018)  -recorded production is 120,000 (FAO, 2018)  49% (Namatovu et al., 2018)	-350,000 tonnes(mt) of feed  2 kg/ m <sup>3</sup>  -250,000 t  -80%	-88,000 tonnes of feed (FAO Smartfish report, 2017)  0.7kg/m <sup>3</sup> (Kilimo-FIEFOC, 2018)  -120000 tonnes (FAO, 2018)  49% (Namatovu et al., 2018)	-Reports and publications -MAAIF data -UBOS statistics -Baseline	Most smallholder fish farmers will have the capacity to access and purchase feed for use at their farms

*Other Outcomes (%ubuhoro zabalanzani)	2. Improved quality and affordable prices of feeds	<ul style="list-style-type: none"> <li>-Prices of feed</li> <li>-Feed Conversion Ratio (FCR)</li> <li>-quality of feed making ingredients</li> </ul>	<ul style="list-style-type: none"> <li>3550 UGX/Kg (NARO-KARDC pricing, 2019)</li> <li>2 (FAO-TCP report, 2014)</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>2800 UGX/Kg</li> <li>1.5</li> <li>Improved quality</li> </ul>	<ul style="list-style-type: none"> <li>3550UGX/Kg (NARO-NARO-KARDC pricing, 2019)</li> <li>2 (FAO-TCP, 2014)</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Midterm &amp; annual reports</li> <li>-MAAIF data</li> <li>-UBOS statistics</li> <li>-Baseline report</li> <li>--NARO-KARDC reports</li> </ul>	All actors in the fish feed industry follow the developed BMPs and guidelines by the implementing team
	Outputs	1. Current local fish feed producers, ingredient, suppliers and feed laboratories profiled; their needs and capacities assessed	<ul style="list-style-type: none"> <li>-number of profiled local fish feed producers</li> <li>-number of profiled local feed laboratories</li> <li>-Number of profiled ingredient suppliers</li> <li>-list of needs and capacities of local fish feed producers</li> </ul>	<ul style="list-style-type: none"> <li>14 local fish feed producers (FAO-TCP report, 2014)</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>At least 21 SMEs (one per district)</li> <li>12 (6 regions 2) feed ingredient suppliers</li> <li>At least 3 local feed laboratories</li> <li>A list of needs and capacities of local fish feed producers</li> </ul>	<ul style="list-style-type: none"> <li>14 local feed producers (FAO-TCP report, 2014)</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Baseline report</li> <li>-Progress reports</li> <li>-Lists of available suppliers of ingredients and feed processors</li> </ul>
2. Best Management Practices (BMPs) on ingredients, feed, feed production & feed management developed; and POs, feed producers, ingredient suppliers; and other stake holders trained in developed BMPs.		<ul style="list-style-type: none"> <li>-number of smallholder farmers trained in BMPs</li> <li>Number of ingredient suppliers trained</li> <li>-number of SMEs trained in BMPs</li> </ul>	<ul style="list-style-type: none"> <li>-Nil</li> <li>-Nil</li> <li>-Nil</li> </ul>	<ul style="list-style-type: none"> <li>At least 40 smallholder fish farmers</li> <li>At least 30</li> <li>At least 30</li> </ul>	<ul style="list-style-type: none"> <li>-Nil</li> <li>-Nil</li> <li>-Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Midterm reports</li> <li>-Lists of farmers, ingredient suppliers &amp; SMEs trained</li> <li>-MAAIF data</li> <li>-M&amp;E report</li> <li>-internal auditors report</li> </ul>	Weather conditions are favourable for hands-on demonstrations

	3. Capacity building of local SMEs in feed data utilisation for development of bankable business funding proposals	<ul style="list-style-type: none"> <li>-Number of SMEs trained in business skills to develop bankable proposals</li> <li>-Number of bankable proposals developed by skilled SMEs</li> </ul>	<p>Nil</p> <p>Nil</p>	<p>At least 21 SMEs (one per district)</p> <p>At least 21 bankable proposals developed (one per SMEs)</p>	<p>Nil</p> <p>Nil</p>	<ul style="list-style-type: none"> <li>-Progress report</li> <li>-M&amp;E Reports</li> <li>-List of trainees' attendance</li> </ul>	Current local feed producers provide the production data
	4. A list of locally produced cost effective non- conventional feed ingredients developed and availed to the feed manufacturers and other stakeholders	<ul style="list-style-type: none"> <li>-A list of non-conventional ingredients with their indicative prices</li> <li>-Number of stakeholders sharing the list</li> </ul>	<p>Nil</p> <p>Nil</p>	<p>At least 6 cost effective locally produced grains and protein pulses identified as ingredients</p> <p>50 stakeholders</p>	<p>Nil</p> <p>Nil</p>	<ul style="list-style-type: none"> <li>- Baseline report</li> <li>-Progress reports,</li> <li>-M &amp;E Reports</li> <li>-List of stakeholders sharing the report</li> </ul>	Ingredients provided are available in large quantities, of good quality at affordable rates
	5. SMEs in feed production and ingredient suppliers trained in UNBS and international standards & compliance.	-Number of SMEs trained	Nil	21 SMEs	Nil	<ul style="list-style-type: none"> <li>-Progress reports</li> <li>-Lists of trainees</li> <li>-M&amp;E reports</li> <li>- List of trainees' attendance</li> <li>-A document of COPs</li> <li>-Simplified UNBS and international standards Document.</li> </ul>	-all will adhere to the UNBS and international standards
		-Number of ingredient suppliers trained	Nil	12 ingredient suppliers	Nil		
		-Simplified UNBS and international standards in Animal/fish feed production.	Nil		Nil		
		- Code of Practices (COPs) for feed ingredients supply	Nil		Nil		

	<p>6. User friendly and gender responsive mechanisms for feed analyses by SMEs involved in fish feed production proposed and linkages between SMEs and central feed analyses centres established.</p>	<p>-Number of simple methods/technologies for testing feed &amp; ingredients proposed (mini-analytical laboratories)</p> <p>-Number of linkages established between SMEs and central feed analyses centres</p> <p>-Number of trained local feed producers (SMEs), POs and other stakeholders</p>	<p>Nil</p> <p>Nil</p> <p>Nil</p>	<p>At least 3 gender responsive mechanisms for feed analyses</p> <p>At least 50 stakeholders</p>	<p>Nil</p> <p>Nil</p> <p>Nil</p>	<p>-Progress reports</p> <p>-Annual reports</p> <p>-M&amp;E reports</p> <p>-List of available simple technologies/mini laboratories</p>	<p>-Willingness for SMEs &amp; ingredient suppliers to meet the costs of feed analyses</p>
	<p>7.0 Feed ingredient dealers, identified and trained in sourcing ingredients for fish feeds and linked to local fish feed producers</p>	<p>- Number of ingredient suppliers identified and trained</p> <p>-Number of linkages made with feed processors</p>	<p>Nil</p> <p>Nil</p>	<p>12</p> <p>12</p>	<p>Nil</p> <p>Nil</p>	<p>-Reports</p> <p>-M&amp;E reports</p> <p>-Lists of trainees</p> <p>-Lists of linkages</p>	<p>-Trained ingredient suppliers keep in the business</p>

	8. Gender responsive technologies & formulations for feeds availed to SMEs feed producers and users	<ul style="list-style-type: none"> <li>-Number of technologies availed to SMEs</li> <li>-Number of formulations availed to SMEs</li> <li>-Number of demonstrations and disseminated on local farms</li> <li>-Number of SMEs trained</li> <li>-Number of SMEs adopting the provided technologies</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>At least 3 formulations</li> <li>2</li> <li>6</li> <li>21</li> <li>At least 21</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Reports</li> <li>-M&amp;E reports</li> <li>-Lists of trainees</li> <li>-Lists of technologies provided</li> </ul>	Cost effective technologies/formulas are adopted
	10. Effective and reliable feed distribution channels clearly defined and made known to POs	<ul style="list-style-type: none"> <li>-Number of POs/farmers trained</li> <li>-Number of established feed distribution channels</li> <li>-Volume of feed traded</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>88,000mt(FAO -TCP report, 2014)</li> </ul>	<ul style="list-style-type: none"> <li>30 farmers;30 SMEs; 18 extension staff</li> <li>At least 6(one in each region)</li> <li>350,000mt</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>88,000mt(FAO-TCP report, 2014)</li> </ul>	<ul style="list-style-type: none"> <li>-Midterm &amp; annual reports</li> <li>-M&amp;E reports</li> <li>-Lists of participants /trainees</li> <li>-Amount of feed</li> </ul>	

	11. Record and data systems on quality and quantities of fish feeds manufactured, distributed and utilized developed and promoted	<ul style="list-style-type: none"> <li>-Updated Mobile applications for data collection available</li> <li>-Number of SMEs trained on Data collection</li> <li>-Number of extension staff trained</li> <li>-Number of POs (farmers trained)</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-01 application for data collection &amp; processing</li> <li>30</li> <li>30</li> <li>30</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Midterm &amp; annual reports</li> <li>-M &amp; E reports</li> <li>-Lists of participants /trainees</li> <li>-Collected data with MAAIF/NARO</li> <li>-Data repositories</li> <li>-Presence of an data collection tool/application</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholders are willing to collect and provide credible data</li> </ul>
	12. Social media platform (Mobile Application) to access and exchange information on feed issues and markets developed in conjunction with PESCA Io 2	<ul style="list-style-type: none"> <li>-Mobile application updated for feed information exchange issues</li> <li>-Number of farmers/stakeholders trained in information access and sharing</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>One mobile platform/ap plication</li> <li>30 farmers;30 SMEs; 18 extension staff</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Reports</li> <li>-Application/e-platform for sharing market, production information on feeds</li> <li>-M&amp;E report</li> <li>-List of trainees</li> </ul>	<ul style="list-style-type: none"> <li>-Participants have skills of using mobile phones</li> </ul>
	13. Fish feed information gathered and packaged in various forms and disseminated to all the stakeholders and beneficiaries	<ul style="list-style-type: none"> <li>-Number of brochures</li> <li>-Number of manuals</li> <li>-Number of journal Publications</li> <li>-Number of stakeholders/beneficiaries receiving the documents</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>2000</li> <li>150</li> <li>5</li> <li>2000 farmers</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> <li>Nil</li> <li>Nil</li> <li>Nil</li> </ul>	<ul style="list-style-type: none"> <li>-Reports</li> <li>-Presence of distributed materials</li> <li>-Publications</li> <li>M&amp;E report</li> <li>-lists of participants</li> </ul>	

## 5 CONCLUSION AND NEXT STEPS

This Action was demanded by MAAIF and supported by EU through the Ministry of Finance, Planning and Economic Development. As a Contractor, the ECRAM led consortium seeks to mobilize, engage and work with all identified stakeholders to address the concerns and interests of MAAIF for the fish feed sector and aquaculture in general as expressed in the TOR and call for this Action. We will therefore be working closely with MAAIF so that we further decipher and address the stated interests. Next steps for action will be availing the project documents and this inception report to all key stakeholders, holding an inception meeting with representatives of the key stakeholders, and conducting a baseline study of the feeds sector prior to implementing all of the above listed activities. This work will be carried out in 24 months, and started from end of December 2019 to end of November 2021.