

TERMS OF REFERENCE
CONSULTANCY TO ASSESS ALTERNATIVE FEED PRODUCTION OPTIONS AND PREPARE A
STRATEGY & PLAN FOR LOCAL FEED PRODUCTION

PROMOTING COMMUNITY BASED CLIMATE RESILIENCE IN THE FISHERIES SECTOR PROJECT
INVESTMENT PROJECT
STRATEGIC PROGRAMME FOR CLIMATE RESILIENCE

I. BACKGROUND

Jamaica is an Archipelagic State located in the Caribbean Sea. Sixty percent of the current population (estimated 2.7 million) resides within 2 kilometers of the coast of the mainland and a majority of the country's GDP is generated in coastal areas. Considering these physical and socio-economic attributes, Jamaica—both the hinterlands and aquatic areas (freshwater and marine)—are extremely vulnerable to climate change and climate variability. The threats include: increases in extreme rainfall events and drought; sea level rise; storm surges; more intense hurricanes; and increased temperatures and ocean acidification.

Some of these events seem to have already been adversely impacting the country. Significant warming of the ocean around Jamaica has been observed. It is anticipated that this will lead to large-scale changes to the marine ecosystems with far-reaching consequences for associated livelihood activities as well as for the coastal protection provided by healthy coral reefs. It is predicted that the Caribbean waters may experience declines in fish catch potential in the range of 5–50% due to warming of 2°C by 2050 and more frequent bleaching events (*Turn Down the Heat III* report, World Bank, 2014). This warming may cause a shift in the species composition of resident wild fish populations and fish species that are cultured.

Therefore, establishing effective measures to protect marine and coastal ecosystems and build resilience to climate change in the fisheries sector would be an important input in sustaining the country's economic growth and rural livelihoods. Against this background, the Project "Promoting Community-based Climate Resilience in the Fisheries Sector" aims at enhancing community-based climate resilience among targeted fishing and fish farming communities of Jamaica. The key outcomes expected from the Project include: (1) Strengthened and climate-smart fisheries and aquaculture policy and regulatory framework; (2) Reduced vulnerability of the targeted fishing and fish farming communities to climate shocks; and (3) Diversified and strengthened livelihoods of targeted artisanal fishers and fish farmers.

The above-mentioned outcomes will be accomplished through the following components: (1) Strengthening the Fisheries and Aquaculture Policy and Regulatory Framework; (2) Diversification, Alternative Livelihoods and Aquaculture for Sustainable Fisheries and Aquaculture including Community-

based Aquaculture, Coastal Mariculture/Poly-culture, and Artisanal Longline fishery for Pelagic species; and (3) Capacity Building and Awareness Raising including Training, Support to fishers' and fish farmers' organizations, and Awareness building and behavior change.

The Promoting Community-Based Climate Resilience in the Fisheries Sector Project is to be executed over a 5-year period by the Ministry of Industry, Commerce, Agriculture and Fisheries (MICAFA).

II. RATIONALE

Aquaculture production includes food fish (Tilapia sp. and Pangasius sp.) and ornamental fish production. A major constraint to the production of fish has been the availability of quality and affordable fish feed across the entire production spectrum (i.e. from larvae to harvestable fish) of aquaculture. Fish feed for the early stages of production (fry, fingerlings etc.) are usually imported or substituted with crushed tilapia ration). All fish feed for the production of Pangasius sp., ornamental fish and the early stages of tilapia production (fry to fingerlings) are imported.

Fish feed represents approximately 60% of feed costs on fish farms and many small-scale farmers are unable to provide fish feed for the entire production cycle due to the high cost of fish feed. This has led to poor growth rates and a high feed conversion ratio. Several approaches to the ensuring cost-effective feed have been suggested, such as, live foods, identifying locally available material that are of a low cost and that may act as substitutes to imported raw material and the introduction of extruded feeds.

III. OBJECTIVE OF THE ASSIGNMENT

In light of the circumstances highlighted above, there is the potential to utilize locally available live foods (e.g. Artemia sp. and green water) to supplement or boost fish feeds that are utilized in ornamental fish and tilapia production. However, a proper balance between the use of these alternative feeds and the commercial diet would have to be determined in order to ensure that tilapia production remains viable.

In this context, the specific objectives of this assignment are twofold:

- a. To assess local production of fish feed (including the use of live feeds or alternatives)
- b. To develop alternative fish feeding strategy and a plan for local fish feed production

IV. SCOPE OF WORK, OUTPUTS AND PAYMENT SCHEDULE

The Consulting Firm is expected to conduct the following activities and tasks:

- a. *Situational Analysis*

The Consulting Firm will be expected to conduct a situational analysis on the availability of fish feed for the aquaculture sub-sector. The assessment should take into account the following: (1) availability, quality, use and cost of the different types of fish feed used in Jamaica across the entire aquaculture production cycle (i.e. brood fish, larval and juvenile stages up to marketable adult fish) for both food fish

and ornamental fish; (2) Determination of the potential demand for fish feed based on current and future projected production of tilapia and other fish species; (3) Assessment of the cost and availability of different types of fish feed specific to the growth cycle of the fish, this will facilitate the development of a feed production plan; (4) An analysis of the supply chain for fish feed production and distribution in Jamaica (including the importation of raw material and finished goods); (5) A review of the regulatory framework for the production and distribution of fish feeds (including the importation of fish feed); (6) Local capacity to produce quality fish feeds for food fish and ornamental fish production across the entire production cycle; (7) Economic feasibility of importing fish feeds across the fish production spectrum; (8) a potential mechanism for increasing access to these imported feeds at competitive prices. In carrying out this task, the Consulting Firm will be expected to engage with local feed producers in order to identify their concerns with respect to the availability, cost, quality of feeds and other relevant concerns, as well as determine their interest/requirements for expansion of local feed producing operations or refurbishment of plant to produce the range of feeds required by local fish farmers.

b. Alternative fish feeding strategy and a plan for local fish feed production

Based on the findings of the situational analysis described under the first task, the Consulting Firm will be expected to identify and provide recommendations for the use of alternative fish feed preparations e.g. green water, live foods, preparation of fish feed using alternative ingredients that are locally available. Such alternative strategy should also include recommendations with respect to the development and utilization of alternative feeding strategies for semi-intensive fish farming with green water and other and take into account their capacity to produce/develop/utilize alternative feed production systems (e.g. green water, live foods etc.). Such alternative fish feeding strategy should also incorporate preliminary findings of the assessment of economic viability of all proposed recommendations.

To support this aspect of the strategy, the Consulting Firm will be expected to develop a business plan for local fish feed production with the objective to determine the economic viability of the proposed recommendations. Such business plan should also include capacity assessment and proposed training needs for fish farmers in the proper feeding techniques using alternative feeding strategies and commercially prepared feeds. As part of the business plan, the Consulting Firm will also be expected to determine the parameters that will facilitate the establishment of clusters in the distribution of fish feed and in particular make recommendations for the establishment of clustering in the distribution of fish feed. Such recommendations should be derived from the following considerations and analyses: (1) An analysis of the local environment in terms of the number of fish farmers, fish feed suppliers, types of fish feed available (i.e. produced or supplied); (2) Reach of suppliers; (3) Constraints or opportunities in terms of the supply or purchase of fish feed; (4) Relationship between fish farmers and feed suppliers; (5) Challenges that they may face in accessing quality fish feeds and also identify other actors/participants in the fish feed value chain e.g. financiers.

Building on the tasks presented above, the Consulting Firm is expected to deliver the following interim deliverables and final outputs:

Deliverables	Timeline	Payment
An inception report which includes a detailed workplan and proposed methodology in carrying out the tasks under this assignment	10 days after commencement of the assignment	10%
Draft Situational analysis of local production of fish feed (including the use of live feeds or alternatives)	40 days after commencement of the assignment	15%
Final Situational analysis of local production of fish feed (including the use of live feeds or alternatives) taking into account feedback from stakeholders' consultations and the Fisheries Department	70 days after commencement of the assignment	30%
Draft alternative fish feeding strategy and a plan for local fish feed production	90 days after commencement of the assignment	15%
Final alternative fish feeding strategy and a plan for local fish feed production taking into account feedback from stakeholders' consultations and the Fisheries Department (3 copies in electronic and hard copy)	120 days after commencement of the assignment	30%

V. QUALIFICATION & EXPERIENCE

The work is expected to be carried out by a Consulting Firm with:

- i. A minimum of five (5) years of proven experience in conducting assessments in aquaculture or a related sector.
- ii. Specific experience of at least three (3) similar assignments
- iii. Experience of at least two (2) assignments in Small Island Developing States, with specific experience in the Caribbean region is highly desirable.
- iv. The Firm should have the demonstrated organizational capacity to provide technical and management support to the project.

The Consulting Firm should field a team comprised of Consultants with at least the following qualifications and experience:

Key Expert 1 with an advanced degree in aquaculture or related field with specialization in fish feed formulation, minimum 10 years of experience in fish feed formulation, experience working with similar issues in tropical developing countries preferred

Key Expert 2 with an advanced degree in Business Administration/Economics or related field, a minimum of eight (8) years of experience in the field of cluster formation, previous experience in fisheries/aquaculture or agriculture will be considered to be an asset

VI. REPORTING/COORDINATION

The Consulting Firm will report to the Project Manager and is also expected to work closely with the staff of the Fisheries Division and also be informed by the work implemented by other consultants under the projects. Such coordination will be ensured by the Project Manager.