TANZANIA FISHERIES RESEARCH INSTITUTE

INCEPTION REPORT

PROJECT TITLE

ASSESSMENT OF CONSUMPTION PATTERNS AND FACTORS ASSOCIATED TO UNDERCONSUMPTION OF TUNA AND TUNA-LIKE SPECIES IN TANZANIA

APPLYING INSTITUTIONS

1.TANZANIA FISHERIES RESEARCH INSTITUTE (TAFIRI), P. O. BOX 9750 DAR ES SALAAM (**APPLICANT**)

2.TANZANIA FOOD AND NUTRITION CENTER (TFNC), P.O.BOX 977, BARACK OBAMA DRIVE, DAR ES SALAAM (**CO-APPLICANT**)

3. AQUA-FARMS ORGANISATION DASF, P.O.BOX 22564 DAR ES SALAAM, UNIVERSITY OF DAR ES SALAAM BUILDING, TANZANIA (**CO-APPLICANT**)

4. MINISTRY OF LIVESTOCK AND FISHERIES, FISHERIES DIVISION P.O.BOX 2462 DAR ES SALAAM, TANZANIA (**CO-APPLICANT**)

6th March 2020

1. Introduction

Tuna and tuna-like fisheries are crucial for the livelihoods of coastal communities in the Western Indian Ocean (WIO) region countries including Tanzania. The fishery is estimated to contribute about 18% of the marine capture fisheries biomass. The most commonly caught tuna and tuna-like species from Tanzania's territorial and Exclusive Economic Zone (EEZ) waters include Kawakawa (*Katsuwonuspelamis*), Skipjack tuna (*Katsuwonuspelamis*), Yellowfin tuna (*Thunnusalbacares)* and Bigeye tuna*(Thunnusobesus)*. Of these Kawakawa and skipjack tuna are mainly caught by artisanal fishers operating longline and ringnet while large scale fishers operating longline catches Yellowfin tuna and Bigeye tuna.

Tuna and tuna-like fishery have the potential to contribute towards addressing poverty, improving living standards and social welfare of the people of Tanzania, which are pillars of National Strategy for Growth and Reduction of Poverty in Mainland, Tanzania (NSGRP II) and Zanzibar Strategy for Growth and Reduction of Poverty (ZSGRP III). Despite significant contribution in terms of marine catches, domestic consumption of the tuna and tuna-like species still remains low compared to other fish species of primary interest such as groupers, rabbit fishes, snappers, and emperors. Factors associated with underconsumption of tuna and tuna-like species in the country are unknown, however, preference for consumption of fish species has been associated with lack of knowledge of the nutritional benefits of the fish as well as socio-economic and cultural factors such as traditional habits, behaviours, attitudes, fish species preferences, income, and socioeconomic classes. Underconsumption of tuna and tuna-like species has been blamed to causelarge financial losses in the tuna fishery sector owing to the lack of stable local market. Instability of the market discourages local investors to venture in the sector. This situation has put at high risk the development of national fleets for exploiting fishery resources especially in the Exclusive Economic Zone (EEZ).

Therefore,**improving our understanding of the consumption patterns and factorsassociated to underconsumption of tuna and tuna-like species in the country**as well as (2) **generating scientific evidence (that is source of micronutrients)onthe health benefits of the fish**is vital, because will provideimportant information needed for changing consumer's perceptions, attitudes and beliefs towards increased consumption of tuna and tuna-like species in the country.

1.1 Purpose of the project
The main objective of this research is togain a full understanding of the consumer's perceptions, attitudes and beliefs, the level of knowledge the community on nutritive and health benefits of commonly caught tuna and tuna-like species as well as to generate scientific evidence that will help to positively transform consumer's perceptions, attitudes and beliefs on the fish.

1.2 Specific tasks of the research
   i.   To examine consumption patterns of the most commonly caught tuna and tuna-like species within coastal communities.
   ii. To assess factors associated with underconsumption of commonly caught tuna and tuna-like relative to most favoured fish species.
   iii. To determine micro nutrient levels in commonly caught tuna and tuna-like along with species of primary interest.

2. Methodology

2.1 Study site: This project will be conducted in three major tuna landing sites along the coastline of Tanzania, including Tanga region (Deep sea, Northern Tanzania), Mtwara region (Shangani, Southern Tanzania) and Unguja (Nungwi). These sites have been selected based on their accessibility, geographical orientation within the country coast and the presence of alarge number of tuna fishers. In addition, in each of the mentioned sites, four fishing villages per site will be visited for social-economic analysis. A total of 12 villages will be visited.

2.2 Approach

The research team will employ multiple approaches but particularly will use the following methodology to gather relevant information;

i. **Inception Workshop**: The team will organize an inception workshop. The purpose of this workshop is to bring together the project team members for further deliberations on undertaking the study. The workshop will provide an opportunity for members to harmonize and reach consensus on addressing potential challenges that may hinder the smooth operation of the project.

ii. **Co-design workshop:**
An inception workshop will be followed by a one-week co-design workshop (the project team, ministry and the DSFA) to refine the proposed research questionnaires. This will assure the project to capture all relevant information that needed to answer the objectives and the research needs of the funder.

iii. **Desk Review**: The team will undertake a detailed review of all relevant documents that touch upon tuna and tuna-like species generally and in Tanzania in particular. This will include published and unpublished documents such as journal articles and technical reports. This information will be gathered through a combination of web-based research, research in libraries and visits to relevant institutions by the survey team members.

iv. **Interviews**: As a primary source of knowledge and information, the survey team will organize interviews with stakeholders. A combined method of structured survey questionnaires **(Annex 1)**and Key Informant Interviews (KIIs) **(Annex 2)**will be employed. The structured survey questionnaire will be used to collect information from fishers and fish consumers. KIIs will be employed to solicit information from fisheries officers. Fishers and fish consumers will be randomly selected from landing sites and village registers while non-random approach will be used to recruit fisheries officers because of their few numbers. The interviewees will be asked questions on demographics; fish consumption; knowledge and attitude towards tuna and tuna-like species. The interviews will also be used to clarify questions arising from the desk review. The sample size of respondents and their distribution by region is presented in **Table 3**.

v. **Collection of fish samples:**At each landing site, individual species of Kawakawa, Skipjack tuna, and Yellowfin tuna will be collected during northeast (NE) monsoon (between November-March) and south-east (SE) monsoon (between June-September). The samples will be kept in vials, stored and then transported to the laboratory for further analysis. Then analysis for micronutrient and fatty acid content will be done at Sokoine University of agriculture following standard methods described by Lars Jorhem(2000), Narayana *et al.*(2006) and Eitenmiller et al. (2016). We will also collect fish biometric information at the landing sites. Along with tuna and tuna-like species, individual species of groupers, rabbit fishes, snappers, and emperors will also be sampled in a similar way.At the field, sample pre-processing will be done, where the fillet of the fish will be cut from the head, middle part and tail of the fish(to capture full body profile) and packed in vials and then kept in cooler boxes during transport before stored in refrigerators. In total we will determine micronutrient profile of eleven species.

vi. **Data analysis**: Collected data will be mainly analyzed througha quantitative approach. Fish consumption data will be cross-tabulated against respondents' demographics' and location to whether the patterns vary across the main respondents' group and socio-economic status. Information on knowledge, attitude and beliefs will be ranked. Pearson chi-square will be employed to test whether the groups differ in knowledge about tuna fishery. For attitudes and perceptions, the weights derived from individual means will be compared using univariate analyses of variance (ANOVA) with *p<0.05* significance level. In addition, Pearson correlation (r) will be used to examine the relationship among the variable's knowledge, attitudes and perception. Cronbach's alpha will be used to estimate the consistency of the scales. All analyses will be conducted in SPSS. Determination of micronutrients levels will be carried out in the laboratory. The individual obtained ash of the samples will be dissolved with 10mls of 10% Hydrochloric acid. The suspension will then be filtered with number one Whatman ash-less filter papers. The filtrate will then be taken to Atomic Absorption Spectrophotometer (UNICAM 919) for iron, calcium and zinc contents at 248.3nm, 422.7nm, 766.5nm respectively. Micronutrients analysis of fish will be tested for a normal distribution within the Shapiro-Wilk test, for homogeneity of variances using Levene's test to assess if the data obeyed parametric assumptions. Two-way ANOVAs will then be used to assess differences of means within landing sites and between seasons. Tukey's HSD test will be performed as a post-hoc mean comparison test for investigation of differences within and between landing site and seasons. All Statistical analyses will be carried out using EnvStats, a package in the R environment for statistics and results reported as means with their standard deviations

vii. **Preparation of a draft Final Report**: The team will prepare a draft final report based on the findings of the study. The draft report will ensure that the requirement outlined in the description of services for the assignment are met.

viii. **Validation workshop**: The survey team will organize a stakeholder's validation workshop, including those participating in the interviews. This workshop will discuss the draft final report on the study. It will also be used to create awareness for the fishing

communities. The workshop will be held in Dar-es-Salaam. The survey team will submit a final report following the validation workshop.

3.0 Key deliverables and work plan for the next steps

3.1 Deliverables
In addition to the present inception report, the survey team shall make the following two major deliverables:
   i.   **Manuscripts**: Two manuscripts will be submitted to a peer-reviewed journal for publication for dissemination to the wider scientific community.
   ii. **Policy reports/Facts:** Two policy briefs/facts will be produced.
   iii. **Final report**: Following the collection of data and validation of the draft report by stakeholders in a workshop. The team will incorporate any feedback received from the stakeholders and produce a final report.

3.2 Work Plan
Table 1: Main activities and work plan.

	Project activity	Time from the start date of the assignment			
		Q1	Q2	Q3	Q4
	Planning phase after approving the proposal for funding	▓	▓		
	Project harmonization and Inception meeting	▓	▓		
	Submission of updated implementation plan after securing the research fund	▓	▓		
	Securing monitoring/research permits from local governments and other relevant authorities	▓	▓		
Objective 1: To examine consumption patterns of most commonly caught tuna and tuna-like species within coastal communities					
1.1	Activity 1: Review existing information on consumption patterns of fish	▓	▓		
1.2	Activity 2: A co-design workshop to develop and refine the proposed questionnaires	▓	▓		
1.3	Activity 3: Field data collection in 12 villages of Tanga, Mtwara and Zanzibar	▓	▓		
1.4	Activity 4: A workshop on data processing, analysis and report writing	▓	▓		
Objective 2: To asses factors associated with underconsumption of commonly caught tuna and tuna-like relative to most favoured fish species					
2.1	Activity 1: Review existing information on factors associated with underconsumption of fish	▓	▓		
2.2	Activity 2: A co-design workshop to develop and refine the proposed questionnaires	▓	▓		

No.	Activity				
2.3	Activity 3: Field data collection in 12 villages of Tanga, Mtwara and Zanzibar	■	■		
2.4	Activity 4: A workshop on data processing, analysis and report writing	■	■		
Objective 3. To determine micronutrient levels in commonly caught tuna and tuna-like along with fish species of primary interest					
3.1	Activity 1: Review on existing information on the micronutrient levels in tuna and tuna-like species along with species of primary interest such as groupers, rabbit fishes, snappers and emperors	■	■	■	■
3.2	Fieldwork to collect fish samples	■	■	■	■
3.3	Determination of micronutrient levels	■	■	■	■
3.4	Activity 4: A workshop on data processing, analysis and report writing			■	■
Finalizing Project phase					
4.1	Dissemination of research project findings to various key stakeholders (meetings and workshops)				■
4.2	Writing two policy briefs/facts				■
4.3	Preparation and submission of two manuscripts		■	■	■
4.4	Preparation of a comprehensive final project report (financial and technical)				■
4.5	Submission of the final report				■

Please note that one quarter (Q) equals to three months

4. Budget

Table 2. A summary of project budget requested.

Item No.	Item	Total cost (USD)	Budget justification	Remarks and percent in relation to the total budget
1	Inception workshop and report writing	2090.00	To facilitate project harmonisation and inception report writing	Lumpsum (4.2 %)
2	Material and instruments for fish samples	3390.00	To facilitate fish sample collection	Lumpsum (6.8 %)
3	Fish samples	4500.00	To facilitate the purchasing of fish samples from fishers	Lumpsum (9.0 %)

4	Stationeries and printer	930.00	To facilitate project activities and stakeholders' workshop	Lumpsum (1.9%)
5	Travel cost (access to field sites, flights)	5600.00	To facilitate data collection	Lumpsum (11.2%)
6	Allowance for researchers and technicians during project implementation	20235.00	To facilitate data collection	Lumpsum (40.1%)
7	Micronutrient sample analysis	5600.00	To facilitate fish sample analysis	Lumpsum(11.2%)
8	Capacity building	5400.00	To facilitate training and a workshop to disseminate the project results and awareness-raising	Lumpsum (10.4%)
9	Other costs	2225.00	To facilitate (1) project administration and communication, (2)Cost for hiring conference room during co-design workshop, data processing, analysis, and writing of manuscripts, reports and policy briefs	Lumpsum (4.5%)
Total Budget		**50000.00**		**100%**

5. Annexes

1. Table 3: Distribution of respondents by study sites

Area	Respondents	No of respondents by site
Tanga region	Fishers Fish consumers Fisheries officers	120 50 4
Mtwara	Fishers Fish consumers Fisheries officers	120 50 4
Unguja	Fishers Fish consumers Fisheries officers	120 50 4

2. Survey questionnaire

TANZANIA FISHERIES RESEARCH INSTITUTE

Examining the **consumption patterns and factors associated to underconsumption of tuna and tuna-like species** within coastal communities, Tanzania

Target population: Fishers and fish consumers

Introduction: Tanzania Fisheries Research Institute (TAFIRI) through funding from Deep Sea Authority is conducting a research project titled '**Assessment of Consumption Patterns and Factors Associated to Underconsumption of Tuna and Tuna-like species in Tanzania'**. The objective of this questionnaire is to obtain your opinion or knowledge about the consumption of tuna and tuna-like species. There are no right or wrong answers to the questions. I anticipate that we may take around 30-40 minutes to complete this questionnaire. I would appreciate it if you could complete all questions.

Your participation in this study is completely voluntary, and you are free to withdraw from the study, as well as any information you have provided, at any point while the data is being collected. Once the data collection phase has ended, individual questionnaires cannot be withdrawn because the data is anonymous. If you wish to stop and/or end involvement in the data collection, you can communicate it to the enumerator to do so. Data collected up to the point of a participant's withdrawal will be destroyed and there will be no consequences associated with your withdrawal.

Basic information

Date of interview	
Enumerators name	

District	
Name of Landing site/Village	
Questionnaire Number	

Section A: Demographic Characteristics (All)

1. Category of respondent
   [1] Fisher   [2] Fish consumer
2. Respondents Gender
   [1] Male [2] Female
3. What is your age?
   [1] Under 18 years [2] 18-30 [3] 31-40 [4] 41-50 [5] 51-60 [6] Over 60
4. Level of education
   [1] No formal education [2] Primary education [3] Incomplete primary education
   [4] Secondary education [5] incomplete secondary education [6] Tertiary education
   [7] Adult education
5. Marital status
   [1] Single [2] Monogamous marriage [3] Polygamous marriage [4] Separated/Divorced
   [5] Widow/er
6. How long have you been living in this area?
   [1] <5 years [2] 5-10 years [3] 11-15 years [4] >15 years
7. What is your household size? _____
8. What is your average household income per month?
   [1] Less than 100,000 [2] 100,000-200,000 [3] 200,001-300000 [4] 300001-400000
   [5] 400001-500000 [6] > 500000

Section B: Fish Consumption (All)

9. Do you or your household buy and/ eat tuna and tuna-like species?   [1] Yes [2] No
10. If No, why?
    [1] Do not like tuna [2] Too expensive [3] Do not like the smell [4] Religious reasons [5] Allergic to fish [6] Fish is not available [7] Other specify

[If no, move to complete knowledge (Section C), attitude questions (Section D) and consumer details (Section E) and then end the interview]

11. Where do you eat fish most? [1] Home [2] Restaurant [3] Other specify_____
12. How often do you or your household eat tuna and tuna-like species?
    [1] Everyday [2] Once a week [3] Once every 2 weeks [4] Once a month [5] Other specify
13. What tuna and tuna-like species do you eat most often?
    [1] Kawakawa [2] Skipjack tuna [3] Yellow fin tuna [4] Bigeye tuna [5] Other specify_____
14. In what state do you most like to eat fish?

[1] Fresh [2] Fried [3] Smoked [4] Sun-dried [5] Salted
[6] Other specify_____

15. What is the best reason why you like eating fish in the state mentioned above?
[1] Easily available [2] Good quality [3] Easy to prepare [4] Affordable and fits budget
[5] Fish is sweet [6] More nutritious [7] Can be bought in small quantities [8] Other
specify_____

16. How much fish do you or your family eat at a typical meal? _____kg

17. Where do you normally buy fish?
[1] Market [2] Fish landing [3] Fish kiosk/shop [4] Door to door seller [5] Supermarket
[6] Other specify_____

18. Why do you buy from these places?
[1] Fish is cheap [2] More accessible [3] Other specify_____

Section C: Knowledge of fish

19. Mention at least four tuna and tuna-like species are you aware of?

_____

_____

_____

_____

20. Tuna and tuna-like species are good sources of Omega 3. What is omega 3?
[1] Carbohydrate [2] Dietary fibre [3] Protein [4] Essential fats [5] Don't know

21. Is eating fish good for a child's growth including brain development?
[1] Yes [2] No [3] Don't know

22. What makes tuna and tuna like species spoil or go bad?
[1] Water [2] Heat [3] Bacteria/germs [4] Enzymes/chemicals [5] Time [6] Don't know
[7] Other specify_____

23. How do you normally tell whether the fresh fish you buy is of good quality or not?
[1] Colour of the skin [2] Gill color [3] Smell [4] Eyes [5] Firmness of the flesh [6] Don't
know [7] Other specify_____

Section D: Consumer perceptions, attitudes and beliefs towards tuna and tuna like species

24. Please tick the box that best indicates your opinion of the following statements

Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Eating tuna fish is good for health					
Tuna fish (any type) is available					
The place where I buy fish is clean and makes me want to buy fish there					
Fish is cheaper than other protein					
Buying tuna and tuna-like species					

is very expensive				
Rich people are the ones buying tuna and tuna-like species				
Consumers are aware of nutritional benefit of tuna				
Socio-cultural aspects are the reasons for under consumption of tuna and tuna-like fish species				

25. Have you ever encountered any problem with tuna fish consumption?
    [1] Yes [2] No
    If yes, what type(s) of problem_____?
26. What is the most appropriate means to inform your community about the health benefits and use of tuna and tuna like species
    [1] Radio [2] Television [3] Newspaper [4] Internet [5] Public meetings [6] Posters/flyers
    [7] Informal conversation [8] Other specify_____
27. What should be done in your opinion to promote the consumption of tuna fish in your communities?
    _____
    _____
    _____
    _____
    _____

Section D: Fishers only

28. Why do you prefer to tuna and tuna-like fish species?
    [1] Sold at high price [2] Ease to fish [3] Preferred species in the market [4] Other specify
    _____
29. What do you perceive about availability of tuna and tuna-like species in fishing ground
    [1] Excellent [2] Good [3] Fair [4] Bad [5] Very bad
30. What do you perceive about investment cost for fishing tuna and tuna-like species against other fish species of primary interest?
    [1] Very high [2] High [3] Moderate [4] Low [5] Very low

3. Key Informant Interview questionnaire

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1. What are the most commonly caught tuna and tuna like species at this site?
   _____
   _____
   _____
   _____
   _____

2. In your own opinion, what percentage of the catch goes to local consumption?
   _____
   _____
   _____

3. Do locals consume tuna and tuna like species? [1] Yes [2] No

4. *If no*, what are the factors that affect consumption of tuna and tuna-like species?
   _____
   _____
   _____

5. *If yes*, what group of tuna is consumed more than the other and why
   _____
   _____

6. Do you think the locals are aware of the health benefits of tuna and tuna-like species?
   [1] Yes [2] No

7. *If yes*, what do you think is still limiting Tuna consumption
   _____

8. *If no*, what is the most effective way to communicate the benefits of the fish?
   [1] Radio [2] Television [3 Newspaper [4] Other specify_____

9. In your own views, what would be the best way to promote consumption of tuna and tuna like species?
   _____
   _____
   _____
   _____
   _____