Investing in rural people

The State of Eritrea

Fisheries Resources Management Programme

Final project design report

Main Report and appendices

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Currency equivalents

Currency Unit	=	Eritrean Nakfa (ERN)
US$1.0	=	15 ERN

Weights and measures

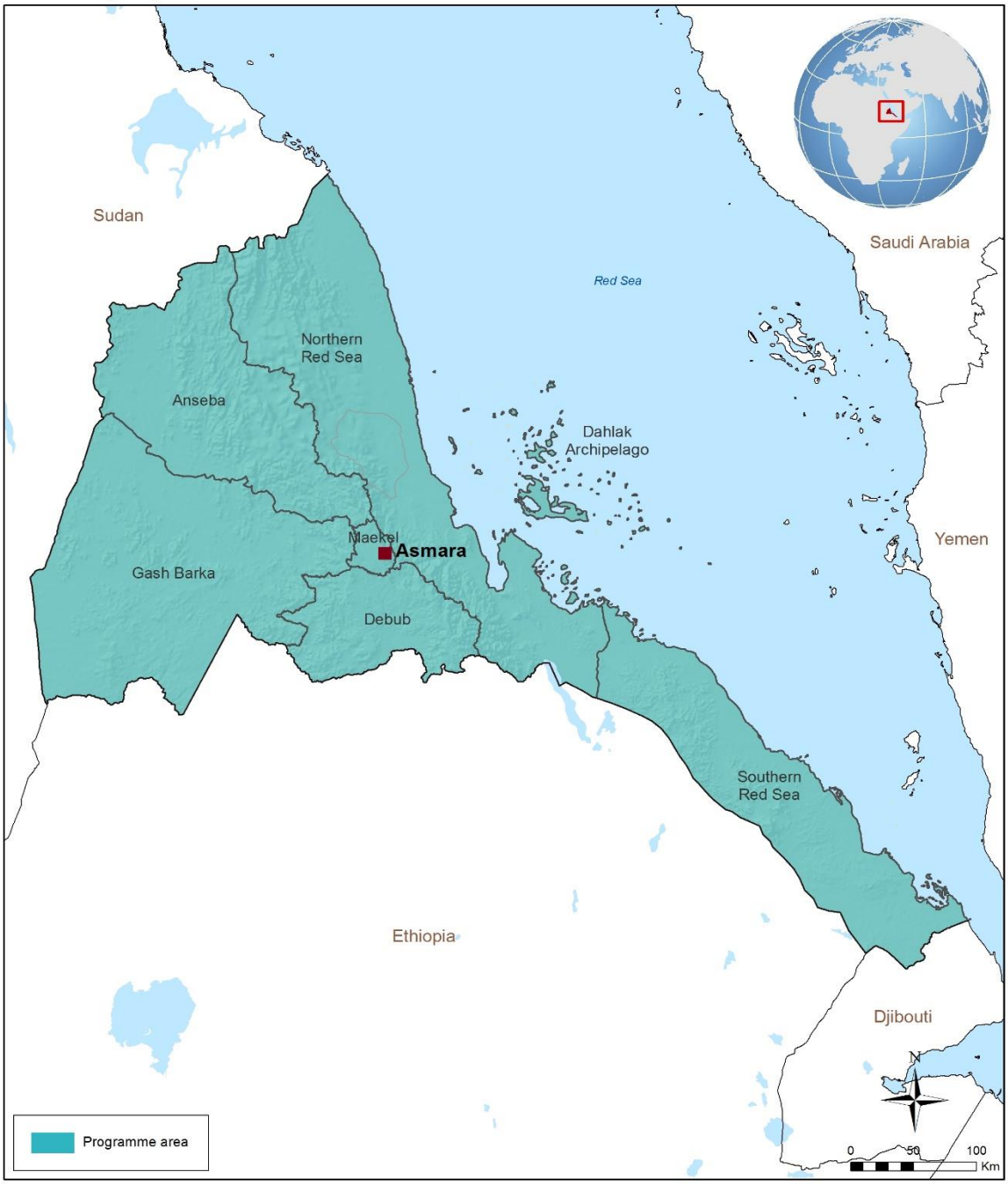
1 kilogram	=	1000 g
1 kg	=	2.204 lb.
1 kilometre (km)	=	0.62 mile
1 metre	=	1.09 yards
1 square metre	=	10.76 square feet
1 acre	=	0.405 hectare
1 hectare	=	2.47 acres

Abbreviations and Acronyms

AfDB	African Development Bank
AWP/B	Annual Work Plan and Budget
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
CCU	Cooperative Credit Unit
COMSAT	College of Marine Science and Technology
COSOP	Country Strategy Opportunities Paper
CPI	Corruption Perceptions Index
CPM	Country Programme Manager
CPMT	Country Programme Management Team
CSN	Country Strategic Note
EC	European Community
EEZ	Exclusive Economic Zone
EMPC	Eritrean Marine Products Company
ERN	Eritrean Nakfa
ERR	Economic Rate of Return
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDP	Fisheries Development Project
FDSC	Fisheries Development Steering Committee
FDTC	Fisheries Development Technical Coordinating Committee
FReMP	Fisheries Resources Management Programme
GBLADP	Gash Barka Livestock and Agricultural Development Project
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
GoE	Government of Eritrea
HDI	Human Development Index
HFTC	Hirgigo Fisheries Training Centre
HIPC	Highly Indebted Poor Country
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ICAM	Integrated Coastal Area Management
ICAMP	Integrated Coastal Area Management Plan
ICB	International Competitive Bidding
ICT	Information and Communication Technology
IDP	Internally Displaced People
ILO	International Labour Organisation
IMF	International Monetary Fund
I-PRSP	Interim Poverty Reduction Strategy Paper
M&E	Monitoring and Evaluation
MLWE	Ministry of Land, Water and Environment
MMR	Ministry of Marine Resources
MOA	Ministry of Agriculture
MRDD	Marine Resources Development Department
MRSD	Marine Resources Regulatory Services Department
MSY	Maximum Sustainable Yield
NAP	National Agricultural Project

NARI	National Agricultural Research Institute
NEAP	National Environmental Action Plan
NFC	National Fisheries Cooperation
NIDP	National Indicative Development Plan
NPCO	National Project Coordination Office
NEPFP	National Economic Policy Framework and Programme
NGO	Non-Governmental Organization
NNSS	National Nutrition Surveillance System
NPCO	National Programme Coordination Office
NSC	National Steering Committee
NUEW	National Union of Eritrean Women
PCRRDP	Post-Crisis Rural Recovery and Development Programme
PIF	Project Investment Proposal
PIM	Programme Implementation Manual
PY	Programme Year
SCCF	Special Climate Change Fund
SOE	Statement of Expenditure
TA	Technical Assistance
UNICEF	United Nations Children's Emergency Fund
UNIDO	United Nations Industrial Development Organisation
UNDP	United Nations Development Project
USD	United States Dollars
WB	World Bank
WHHs	Woman Headed Households
ZNRS	Zoba Northern Red Sea
ZPCO	Zoba Programme Coordination Office
ZSRS	Zoba Southern Red Sea

Map of the programme area



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Map compiled by IFAD | 29-03-2016

Executive Summary

Strategic Context – More than two decades after attaining its independence in 1993, Eritrea is still faced with many development challenges. The main economic sectors are yet to fully recover from the effects of 30 years of war, leading to a state of high unemployment, few income generating opportunities and general poverty. The situation has been worsened by periodic droughts which, given the country's dependence on rain fed agriculture, make it highly vulnerable to food and nutrition insecurity.

The country is aiming at creating a modern, private sector-led economy (Macro Policy 1994; National Indicative Development Plan 2014-2018)[1]. However, the attainment of this objective is still limited by inadequate enabling business environment for investment, United Nations' sanctions, and overall weak macroeconomic conditions. The Government of Eritrea (GoE) has placed high priority on building an efficient national governance structure and developing its own capacities to manage policies and productively exploit the country's abundant natural resources for sustainable socio-economic development (Ministry of Land, Water and Environment, 1997).

However, the country continues to face foreign exchange shortages, making it difficult to meet its import needs, thus forcing it to operate at lower levels of capacity. In addition, shortages of skilled manpower continue to hinder the country's development ambitions. In terms of the Human Development Index (HDI)[2], Eritrea, with a score of 0.391 was ranked 186th out of the 188 countries reported in 2014. The low HDI score is attributed to Eritrea's high levels of poverty and weak growth redistribution strategies, especially their low impact in improving the rural majority's share in the country's GDP. The country also scored poorly in the global hunger index (GHI)[3] with a GHI score of 33.8 in 2014.

Nonetheless, recent economic performance has been positive, driven mainly by the mining sector. Real Gross Domestic Product (GDP) growth is estimated to have increased from 2.0% in 2014 to 2.1% in 2015, double the rate in 2013. The current GDP composition is: services (59.9%), non-manufacturing (17.3%), agriculture, animal husbandry, forestry and fisheries (16.9%) and industry (5.9%). Going forward, growth is expected to further benefit from a revitalised housing and construction sector, infrastructure development, improved trade with Middle-Eastern and Asian countries, additional mining activities, growth in the food sector, and the development of tourism and continued improvements in public financial management.

Agriculture, animal husbandry and fishing are the mainstay of majority of the population and accounts for about 20-30% of commodity exports (Agriculture Sector Strategy, 2014) with about between 60% to 70% of the population relying on these sub-sectors for their livelihoods. However these sectors are affected by highly variable climatic conditions, inefficient subsistence rain-fed farming system, limited resource allocation, and low profit margins and contribute a small share of the country's GDP. Moreover, private-sector activity, dominated by trade and services, remains weak, and access to hard currency is a major constraint. The fact that over 80% of the poor live in rural areas and depend on agriculture suggests that increasing agricultural production and productivity would have a significant impact on poverty. Eritrea has 26% arable land, but only 4% under cultivation. Mining (copper, gold, iron ore, nickel, silica, sulphur, marble, granite and potash) is becoming important and the main attraction for foreign investment. Over the medium term, the Government sees further prospects in improved trade with Middle-Eastern and Asian countries, additional mining activities, growth of the food sector and the development of the tourist industry. The growth outlook is promising if Eritrea

[1] African Economic Outlook; AfDB, OECD, UNDP 2015.
[2] The Human Development Index Report is produced by UNDP (2015): http://hdr.undp.org/en/2015-report
[3] GHI is produced by the International Food Policy Research Institute and is an aggregated measure of four key indices, namely; overall undernourishment, child wasting, child stunting and child mortality: http://www.ifpri.org/topic/global-hunger-index

exploits all its opportunities for trade and opens its economy to foreign investment other than in the mining sector.

Exports are estimated to have grown in 2014-15, mainly driven by mineral production, but the current account balance is estimated to have deteriorated from 0.2% of GDP in 2014 to -1.2% in 2015 and is forecast to be -1.5% of GDP in 2016. This is partly due to decreases in both remittances and the 'development and recovery tax' (a 2% tax levied on the Eritrean diaspora). Based on the International Monetary Fund (IMF) Article IV 2009[4], Eritrea is a pre-decision point Highly Indebted Poor Country (HIPC) and is therefore eligible or potentially eligible for HIPC Initiative multilateral debt relief (MDR). However, no discussions on an IMF-supported programme have been initiated, although the Government is engaged with the IMF's capacity-building institute through the East African Regional Technical Assistance Centre (E-Afritac), and is expected to benefit from the African Development Bank's Transition Support Facility.

Justification and Rationale – Eritrea has substantial and relatively underexploited marine and fisheries resources, comprising nearly 1,000 fish species that have been underutilized for decades. These exist in an unpolluted, underexploited and under-capitalized marine environment. The fisheries sector contributes to about 3% of the country's GDP. The Maximum Sustainable Yield (MSY) of Eritrea Red Sea fisheries has been estimated, by several sources, at about 80,000 tonnes per year. However this needs to be taken with caution as there have not been recent actual stock assessment surveys for Eritrea. On the basis of historical information some fisheries' experts give a more prudent MSY estimate (in the range 40,000 tonnes – 80,000 tonnes per year). Recorded total fish catches, though, rarely exceed 10,000 tonnes, of which less than 2,000 tonnes is from small-scale fisheries. The MSY for small pelagic fish in particular is estimated at between 24,000 and 50,000 tonnes per year, and currently this resource is hardly utilized.

FReMP will support MMR to ensure these marine fisheries resources are utilized in a sustainable manner to improve the livelihoods of coastal communities. To do so, the Programme will adopt the *precautionary approach*, a widely used methodology that is based on exercising prudent foresight to avoid untenable situations, taking into account that "changes in fisheries systems are only slowly reversible, difficult to control, not well understood, and subject to change in the environment and human values"[5]. Specifically, FReMP will: a) support increased fish production, but ensure the levels do not exceed historical MSY estimates (for small pelagics it will be limited to 19,000 tonnes per year); b) support MMR's monitoring and enforcement capacity; c) update MSY estimates and adjust targets where needed; and d) invest in restoration and protection of the ecosystem.

This total production represents an estimated gross first sales value at landing of about USD 50 million. This value of production comes with huge investment potential in fishing, processing and other support services, like boat building, supply of fishing gear, cold storage, production of ice and packaging material, up-country opportunities in fish distribution and marketing. There is also a high potential for tourism in the islands, coastal and marine environment, which have large areas of unique coral reef, containing nearly 220 species of coral and rare ornamental fish species. FReMP has a different focus and will not invest in this tourism). The mangrove forests also offer opportunities for supplementing livelihoods, with honey production and fodder for small stock. Nevertheless, the health of the mangrove forests is essential to the coastal ecosystems, a contribution to livelihoods in terms of fodder and fuelwood, and the viability of the fisheries in the medium and long term.

The Eritrean fishery consists of both small scale and industrial fishing operations. The small-scale fishers in the coastal areas include those using boats and canoes, foot fishers (mainly women and youth) and also crew members. By definition, small scale fishers are traditional fishers, often involving whole households, using relatively small amounts of capital and energy, relatively small fishing

[4] http://www.imf.org/external/np/pp/eng/2013/071813.pdf; Only 2009 information is available from IMF, because since then there has been no agreement on mission dates and modalities for the next Article IV with the Government of Eritrea.
[5] See http://www.fao.org/docrep/003/w3592e/w3592e07.htm

vessels (if any), making short fishing trips, close to shore, and mainly for local trade and consumption. Artisanal or small scale fisheries can be subsistence or commercial, providing primarily for local consumption or export.

FReMP target group is located in the villages along the Red Sea Coast in Zoba Northern Red Sea (ZNRS) and Zoba Southern Red Sea (ZSRS), and who are linked to particular landing sites where they deliver fish. These fishers mainly use traditional motorized wooden boats (Houri: traditional wooden boats with outboard petrol engines, and Sambuks: wooden boats with inboard diesel engines), with only a few of them using improved motorized fibre-glass boats. The small-scale fishers operating motorized boats are registered and their number has been estimated at about 3,300, of which 1,112 belong to the fishers' cooperatives. The registered small-scale fishers own about 793 boats of which 602 (76%) are owned by the cooperative members. A major limitation of these boats is their small size with a carrying capacity of 0.5-1.0 tonnes. Their small size also limits the fishing range and the quantity of catch per trip. Most of the boats are currently not functional either due to life span, lack of proper maintenance, shortage of spare parts, inadequate gear, infrequent fish supply and high cost of fuel. Some of the FReMP beneficiaries are "foot fishers" who do not own any fishing assets. FReMP will address many of these limiting factors and contribute to increased productivity, production and improved livelihoods of the target beneficiaries.

Inland fisheries and aquaculture present another investment area to increase fish production, incomes and nutrition, especially in the rural inland Zobas (Regions). GoE, with support of other development partners, has invested significantly in the construction of water retention dams in the inland Zobas, many of which have sufficient water volumes and other ideal conditions for raising fish. Over 330 reservoirs have been established, of which 70 are stocked with different fish species, mostly tilapia, carp and catfishes. MMR has assessed some of these reservoirs and determined that the fish are well established, productive and achieving good growth (See Appendix 15 for details). However, the inland fisheries resources are hardly exploited at the moment, as local communities generally are not aware of the nutritional benefits and they lack fishing skills and equipment, besides the fact that fishing is not their tradition. This can be changed through awareness creation, imparting the right skills and enabling the communities (especially youths and women) to acquire equipment for fishing, fish processing and marketing. In addition, there are prospects for investments in aquaculture using cages placed within the water reservoirs, or in external ponds drawing water from the reservoirs. FReMP will intervene in these areas to increase not only the target group's incomes, but also improve their food and nutrition security, through availability of increased quantity and quality fish. FReMP will target only 15 water reservoirs to demonstrate good practices and successful models that can be replicated and scaled up in the other reservoirs. It is projected that about 100 tonnes of fish per year will be produced from the water reservoirs to be supported by FReMP; while all the 70 stocked dams in the country can produce approximately 350 tonnes of fish per year. The inland fisheries are potentially vulnerable to the deterioration of ecosystems in the watersheds above the reservoirs – where the Programme will assist in developing climate resilient conservation plans, which will have the ancillary benefits of improving crop and livestock production and, thus, nutrition.

Programme Area – FReMP will be national in scope targeting all six Zobas, including the Eritrea coastal and inland areas; the latter particularly targeting water reservoirs for aquaculture and up-country fish markets. Eritrea's fishing area is about 120,000 km^2 Exclusive Economic Zone (EEZ), of which the country's territorial waters cover 55,000 km^2. There are more than 350 islands, although only a few (estimated at 10) are inhabited. For operational purposes, landing sites spread along Eritrea's 1,350 km long coastline will be the entry points for the FReMP's investments in the coastal zone. The coast line is divided into two Zobas: ZNRS and ZSRS. There are a total of eight landing sites, most of which are well established with good infrastructure. These include: Massawa (Ghibi), Massawa (Erifish), Dahlak, Galaelo in ZNRS; and Assab, Tio, Eddi, and Barasole in ZSRS. In the inland Zobas (Anseba, Debub, Gash Barka, and Maekel), the Programme will be site-specific and will operate in areas with selected dams, principally to promote effective and sustainable inland fisheries to boost household incomes and nutrition for rural populations. It will also engage in promotion of fish consumption by rural and urban households.

Target Group – The target group of the Programme consists of: a) small-scale fishers (i.e. men and women that are either small boat owners, crew members, foot fishers[6]) that will be dealt with either as individuals or as cooperatives/groups; b) rural smallholders (non-fishers mainly involved in subsistence agriculture and keeping small livestock) living around the target water reservoirs in inland Zobas and interested to engage in economic activities along selected links of the inland fisheries supply chain. This group also includes smallholders living and involved in rehabilitation of the catchment areas of the target water reservoirs; c) youth entrepreneurs (fishers and non-fishers) interested in establishing business enterprises/cooperatives to respond to market demand for fishery products and services; d) women, and especially women headed households (WHHs), accounting for at least 30% of the Programme's beneficiaries; and e) demobilised soldiers and Internally Displace People (IDPs).

Programme's Goal and Development Objective – FReMP will be implemented over a seven-year period, from 2017 to 2023. The Programme's **Goal** is to "*contribute to household food and nutrition security and the alleviation of rural poverty".* **The Programme Development Objective** is "*Increased incomes and improved nutrition situation for targeted beneficiaries and sustainable management of natural resources".* In pursuit of this objective, FReMP will support the marine and inland small-scale fishers to produce a surplus, within the maximum sustainable yield of the fisheries, for the market and forge sustainable partnerships linkages with various actors along the fish production and marketing channel. The aim will be transform the small-scale fisheries sector in Eritrea from subsistence[7] to a sustainable commercial sector.

Programme Components – The Programme's development objective will be achieved through the effective implementation of two components supported by capacity building and implementation support services.

Component 1: Component 1: Develop Sustainable Fisheries Systems (USD 11.4 Million) – The component will support the establishment of necessary infrastructure, and technologies for production and post-harvest operations, marketing and consumption of both marine and inland fisheries. This will be achieved through a set of three subcomponents:

- ***Subcomponent 1.1: Development of Marine Fisheries Production and Post-Harvest Systems*** – The subcomponent will focus on putting infrastructure and technologies in place for the effective and sustainable production of fish and fish products that would be linked to markets. Eritrea's marine fishery sub-sector includes cold and dry fish production and market linkages supplied by industrial fishery[8] (mainly licensed foreign fishing vessels) and artisanal fishers operating at least four types of fishing boat technologies. The cold supply chain is well established and deals with large pelagic fish and demersal species, including commercially valuable reef dwelling fish, such as groupers, snappers and emperors. The demersal fish include lizardfish and breams, while the large pelagic fish include jacks, trevallies, mackerels, tunas and sharks. The dry fish supply chain handles mainly the small pelagic sardines and anchovies, but is poorly developed following years of conflict from which it has not fully recovered. The Programme will address some of the major development challenges facing the country's marine fishery sub-sector at both production and post-harvest levels. At the production level, the country has not fully re-built its national fishing fleet following years of conflict and does not have enough capacity to fully utilize its EEZ. This affects both the large pelagic and demersal fish entering the cold supply chain as well as the small pelagic fishery destined for the dry fish supply chain. To adequately respond to the needs of the marine fishing sector, FReMP will support: (a) establishment of ice-making facility at one fish landing site to enhance the cold-fish chain; (b) construction of solar fish drying facilities at fish landing sites particularly to reduce post-harvest losses and enhance quality of small-pelagic fisheries; (c)establishment of multi-purpose facilities to facilitate fish business

[6]Foot fishers are small scale fishers who access the fishing grounds on foot as they lack fishing assets and catch fish mainly for subsistence purposes.
[7]Subsistence fishing refers to fishing activities targeting household food with very limited sale of the catch as opposed to commercial fishing that mainly target income but may make provision for household food. Even though both fisheries are referred to as small scale fisheries.
[8]Typically, the goal of an industrial fishery is to catch as many fish as possible for economic gain. This carries with it various risks of overfishing of a fish population, causing the fishery to 'crash', among several other dangers. The size of the boats used is usually on the larger end with the commensurate amount of capital invested per man-on board.

services delivery; (d) piloting different fish processing/value addition technologies; (e) piloting mariculture technologies, and (f) Coastal ecosystem management.

- ***Subcomponent 1.2:*** **Development and Sustainable Utilization of Inland Fisheries –** The focus of this subcomponent will be to augment the GoE's efforts to develop inland fisheries in order to complement the marine fisheries resources towards meeting the increasing fish demand in the rural and urban areas as an alternative/complement of meat products. MMR has stocked fish in water reservoirs, which are currently not being utilized by local communities to improve their nutrition and incomes. This is attributed to their inadequate awareness on the nutritional importance of fish, lack of skills and equipment for fishing and post-harvest handling and a non-fishing tradition. To respond to this need, FReMP will assist all concerned stakeholders to develop and implement management plans for the resources and a system, through which local communities can sustainably use the fisheries. This will include establishing and building capacity of fishing enterprise units, mainly composed of youth, and fish processing/marketing enterprise groups run mostly by women. The groups will be facilitated to acquire the inputs for fishing, fish processing and marketing (refer to Component 2 for details). The interventions on inland fisheries will take place in the four inland Zobas – Anseba, Debub, Gash Barka, and Maekel. The Programme will target a total of 15 water reservoirs, which will be selected through a transparent criteria, with the objective of developing a model that can be replicated by the Government, other development partners or local communities in other water reservoirs.

- ***Subcomponent 1.3:*** **Market development and Promotion of Fish consumption–** This sub-component will support activities under three intervention areas: (i) Market development; (ii) establishment of an umbrella cooperative for national distribution and marketing small-pelagic fisheries and (iii) promoting consumption of fisheries products to improve nutrition. Under market development. FReMP will support market surveys to keep in line with the market dynamics and align production activities with increasing demand. Attention will be put on development of marketing strategies for different fish products and technologies introduced by the Programme. Effort, will be made to establish market linkages and outlets for each cooperative/enterprise groups in the Programme. The Programme will strengthen the national capacity to develop regulations and standards for food quality and safety with respect to fishery products and support branding and promotion of viable fishery products into the local markets. Additional support will be provided for operationalization of the food quality laboratory which is vital for Eritrean fisheries to access export markets. The programme will also support the establishment of an umbrella cooperative for national distribution and marketing of small-pelagic fisheries filling an existing gap in the marketing system. The third intervention area is to promote consumption of fisheries products for improved nutrition. This activity will target the traditionally non-fish eating communities, non-fishing communities, households at the dam catchment areas, women and children. Generally, communities that are far away from the sea are not familiar with fishing activities and tend to have poor fish eating habits. Value added products (such as pickle/fermented fish products, fish powder, protein concentrates, fish oil, fish-based snacks, etc.) will be promoted for consumption at households, in hospitals for malnourished children and schools. In promoting consumption of fisheries products FReMP will target the traditionally non-fish eating communities, non-fishing communities, households at the dam catchment areas, women and children. Generally, communities that are far away from the sea are not familiar with fishing activities and tend to have poor fish eating habits. The value added products will be promoted for consumption at households, in hospitals for malnourished children and schools. Fish consumption will be promoted through the existing multi-sectoral approach for community-based interventions.

Component 2: Fisheries Enterprises Support Services (USD 9.3 Million) – This component seeks to achieve two objectives: a) promote the development and capacity building of cooperatives and other enterprise groups; and b) strengthen the input provision services to ensure that the legally constituted cooperatives and enterprise groups have access to the requisite inputs to undertake economically viable and sustainable fish-related businesses. The experience generated under the FDP will be used to guide activities foreseen under the different interventions. These objectives are to be achieved, through a set of two subcomponents.

- ***Subcomponent 2.1:*** **Entrepreneurial Capacity Development –** The subcomponent will focus on mobilisation and facilitating the organisation of stakeholders at different links of the fisheries production and market process (production/fishing, net making and mending, engine repair, drying, processing, marketing, etc.) with the objective of making them ready to effectively access and use the input provision services by the Cooperative Support Unit (CSU). A total of over 4,200 households are expected to benefit from capacity development who belong to different co-operatives and enterprise groups in fish production and post-harvest system. They include; fishing cooperatives for small pelagic fish, fish processing/marketing cooperatives and enterprise groups, additional cooperatives for the large fish, fish retailing cooperatives, cooperatives for foot fishers, entrepreneurs for boat/engine repair, women co-operatives for net making/mending, and fishing enterprise groups around the target dams. In order for the organised groups/cooperatives to be linked to/and benefit from the services of the CSU, they must be duly registered. The Programme will adopt a stepwise approach successfully employed under FDP, for the creation of viable and sustainable cooperatives;

- ***Subcomponent 2.2:*** **Strengthen Input Supply Services –** This subcomponent will focus on consolidating the revolving assets financing system, already established and operational under the FDP, for the sustainable supply of inputs needed by the small-scale stakeholders at the different links of the fisheries production and market process. However, the Cooperative Credit Unit (CCU), created and nurtured during FDP will be transformed into the Cooperative Support Unit (CSU) and strengthened further. One of the key differences between the CCU (under FDP), and the CSU (under FReMP) is the fact that the CSU, in addition to providing the asset financing services, will also provide management support services to cooperatives. One of the functions that were not undertaken by the CCU, under FDP, was the transformation into an autonomous (or semi-autonomous) entity. This is an area that FReMP will put particular emphasis on.

Component 3: Institutional Strengthening and Implementation Support (USD 8.1 Million) – This is a cross-cutting component servicing the two technical components. The objective of the component is two-fold. It will ensure that the institutions mandated with the responsibilities of implementing and overseeing the different implementation processes of FReMP have the requisite capacity to effectively execute their respective duties. Secondly, it will facilitate and manage the Programme in an efficient and effective manner by providing overall coordination, including planning and implementation, financial management and control, procurement support, monitoring and evaluation, knowledge management and sharing, progress reporting, and liaison with all relevant institutions. For this purpose, Programme Coordination Offices (PCOs) will be established at the national and Zoba levels for the effective coordination and implementation of the different Programme activities.

Nutrition considerations– FReMP will support the Government strategy on food security and nutrition, particularly through utilization of small pelagic fish and inland fisheries. Per capita fish consumption in the country is estimated at about 0.4 kg per year, which is quite low compared to other African countries[9], and especially coastal states, partly due to inconsistent supply. In addition to increasing the availability of fish supplies, the other actions to promote fish consumption will include awareness campaigns, development of different nutritious recipes, nutrition education and behaviour change communication. The actions will build on the existing multi-sectoral approach taken by the Government for community based interventions. Potential collaboration with other line ministries will be explored in promotion of fish-based products in hospitals and schools for extended outreach to vulnerable groups.

Social, Environment and Climate Assessment Procedures (SECAP) – The potential social and environmental impact of FReMP was reviewed according to IFAD's SECAP procedures. The risk of overexploitation of marine fish resources deserves key attention of the Programme and MMR, but an overarching risk management strategy has been adequately integrated into the design. All other potential negative impacts by the Programme are limited, site-specific and mitigation measures are identified.

[9] Per capita fish consumption for African countries is 9.6 Kg per year while global per capita fish consumption is 19.2 Kg per year (*FAO, State of World Fisheries and Aquaculture Report, 2014*).

In conclusion, the overall Programme is categorized as social and environmental **Category B**. The Programme's sensitivity to climate change impacts is assessed as **moderate**. Similar to the environmental and social categorization, the largest risk emanates from the unknown impact of increasing sea temperatures on marine fish resources. The Programme however, through its precautionary approach, will be able to adjust to changes in fish stocks. Climate risks to other Programme interventions are minimal and can be readily addressed through mitigation measures, which have been integrated into the programme design. Moreover, FReMP will support planned adaptation as outlined in GoE's National Adaptation Programme of Action (NAPA) through development and establishment of new enclosure areas and implementation of sustainable land management practices. The Programme will directly feed into the country's 'Green Growth' strategy and simultaneously reduce Greenhouse Gas (GHG) emissions through coastal and inland ecosystem management.

Approach – The overall approach of the Programme is strengthening production systems and market linkages. FReMP will use communities as the entry point engaging local institutions in participatory planning procedures toward sustainable fisheries development. The Programme will be implemented through, and be fully embedded into, the GoE decentralised system. Sustainability will be a central concern shaping the Programme approach. The Programme will support and encourage enterprises to engage with markets to increase the returns to their efforts and investments. Implementation arrangements will set up public and private mechanisms for post-Programme continuity of benefits. FReMP will support gender mainstreaming across the Programme. This will include: a) ensuring that gender issues are considered in any policy dialogue; b) training NPCO and ZPCO staff in gender issues, reflecting gender responsibilities in terms of reference, screening Programme work plans and support entities for their gender sensitivity and identifying a gender focal point at national and zoba levels; c) having a strong focus on women's participation in Programme activities, particularly small pelagic fish production and market linkages; and d) closely monitoring gender empowerment.

Partnership – FReMP will coordinate and harmonize with Programmes/Projects financed by various development partners that support FReMP-related thematic areas. This would be aimed at taking advantage of existent synergies and avoiding duplications. The Programme will complement and build on interventions by the other development partners to ensure a harmonized contribution to the Government's strategic priorities and development targets in the sector. Potential collaboration will be explored with the following development partners[10]: Federal Republic of Germany, African Development Bank (AfDB), European Union, United Nations Development Programme (UNDP), Global Environmental Fund (GEF), Food and Agriculture Organization of the United Nations (FAO), and United Nations Industrial Development Organisation (UNIDO). Where applicable, collaboration mechanisms will be firmed up and formalised in form of Memoranda of Understanding.

Scaling-Up – During the design of FReMP, scaling-up was addressed from two perspectives. First of all, it was looked at from the perspective of what has been tested and proven and is ready to be replicated. In this regard, FDP has established an asset financing model, is proving to be instrumental in sustaining the country's small-scale fishing sector, particularly of the large fish along the coastal areas. FReMP will use the tested and proven model to commercialise the small pelagic fish and inland fisheries supply chains. Qualifying actors at the different links of the chains will be able to access the inputs they need to actively participate in income generating activities. Secondly, scaling-up was considered from the perspective of piloting certain practices during the implementation of FReMP with the objective of establishing both technical and economic viability. These include mariculture and aquaculture pilots in marine and inland systems respectively. More significantly, the inland fisheries intervention is based on targeting only 15 water reservoirs for documenting lessons and demonstrating good practices. The intention is that these models will be replicated on a larger scale to the remaining water reservoirs across the country. When successfully established, the information will be made available for replication by either GoE or its development partners. In this regard, the practices to be piloted include: a) sustainable production and utilisation of inland fisheries in water reservoirs; and b) mariculture technologies for increased productivity of marine species.

[10] The following pledges have been made to co-finance FReMP: Federal Republic of Germany to the tune of Euro 10 million, GEF will provide USD 7.8 million, and FAO through a TCP for USD 0.5 million for TA support.

Organisational Framework– The management, coordination and implementation of FReMP will involve various government institutions as well as private sector entities, where applicable, that will play different roles at various levels for effective delivery of the Programme to the intended beneficiaries. The Ministry of Marine Resources will be the lead executing agency and will be supported by: a) the Programme Steering Committee (PSC), chaired by the Minister for MMR, and composed of ministers of those ministries with direct relevance to the achievement of FReMP's goal and development objective; and b) National Project Coordination Office (NPCO) that will be adequately staffed. At the Zoba level, FReMP will be managed and coordinated through the respective Zoba Administration systems. The day-to-day implementation and coordination will be the responsibility of the respective Zoba administration, under the direction of the Governors. Zoba Programme Coordination Offices (ZPCOs) will be introduced in all the six Zobas to strengthen management and coordination of FReMP.

Programme Costs and Financing – The total combined FReMP investment and incremental recurrent costs, including physical and price contingencies, are estimated at US$ 32.12 million (ERN 539 million). The Programme will be financed by the Government of Eritrea, IFAD grant, Federal Republic of Germany, GEF, FAO and beneficiary contribution. IFAD has confirmed a grant of USD 15 million from IFAD (46.7% of the Programme costs), the Federal Republic of Germany will contribute USD 5.96 (18.6% of total Programme costs), GEF has committed USD 7.89 million, representing 24.6% of total Programme costs, FAO will contribute USD 0.5 million (1.6% of total Programme costs), and the beneficiaries are to contribute about 4.2% in form of participation in construction or setting up fishery site and purchase of petty inputs like fishing gears. This will cost about USD 1.35 million in monetary terms. The Government will finance the taxes and duties (USD 1.41 million, representing 4.4% of total costs).

Benefits and Beneficiaries – In total, FReMP is targeting 17,500 households (87,500 people) through 600 groups. The cost per beneficiary is USD 361 (about USD 1,800 per household; assuming that, on the average, a household consists of five people). The Programme will provide direct support to inland fishing groups/cooperatives, small pelagic fishing enterprises, fish value addition enterprises (fish drying), fish mongers/traders, fish marketing and provision of key inputs through the CSU and establishment of a sustainable ice plant. Expected benefits include: a) increases in production and quality of marketable fish; b) higher prices to producers and, at the same time, traders due to aggregation of fish products and improving the market processes; c) increased community level resource rental revenues; d) consumer benefit through availability of fish products at lower prices by reducing inefficiencies along the marketing system, and e) Government systems empowered and benefiting from capacity development.

The Economic Analysis – In the overall aggregation, the Programme has the potential to generate an Economic Rate of Return (ERR) of 17% over a 10-year period.

Impact Indicators – FReMP is expected to facilitate the development of sustainable production and market linkages for marine and inland fisheries and deliver increased volumes of fish to consumers, through increased production, processing and marketing of different fish products. This will contribute to increased incomes of small-scale fishers in the coastal and inland communities; increased volume and quality of marketed fish in coastal and inland areas; and enhanced food and nutrition security in the target communities. Main impact indicators at the goal level are: a) 5 % reduction in prevalence rate of chronic malnutrition and child stunting; and b) 10% increase in household asset ownership. Progress towards the achievement of the Programme Development Objective will be measured using the following indicators: a) at least 30% increase in fish production for small-scale fishers; b) at least 30% increase in incomes of fish-related enterprises for small-scale fishers, fish processors, and fish traders; and c) 1,500 ha of watershed and 16,000 ha of mangrove under sustainable management.

FReMP Economic and Financial Analysis: Summary Tables

A)

FINANCIAL ANALYSIS	PRODUCTION				PROCESSING		OTHER	
	Farm models'net incremental benefits (in '000 of ERN)				Processing and activity models'net incremental benefits (in '000 of ERN)		Enterprise and marketing models'net incremental benefits (in '000 of ERN)	
	Small pelagic	Inland fishing			Fish value addition		Dried fish trading	
PY1	(832)	(58)			(304)		(96)	
PY2	108	22			(55)		19	
PY3	167	52			139		26	
PY4	167	52			139		29	
PY5	167	52			139		29	
PY6	167	52			139		29	
PY7	167	52			139		29	
PY8	167	52			139		29	
PY9	167	52			139		29	
PY10	167	52			139		29	
NPV (ERN.)	69	193			293		54	
NPV (USD)	4.6	12.9			19.51		3.6	
FIRR (@10%)	12%	67.1%			26.9%		23.2%	

B)

PROJECT COSTS AND INDICATORS FOR LOGFRAME						
TOTAL PROJECT COSTS (in million USD)	**31.6**	Base costs	28.7	PMU	4.6	
Beneficiaries	**87,500** people	17,500 Households	600 groups			
Cost per beneficiary	**361** USD x person	1,806 USD x HH	**Adoption rates**	**92%**		

Components and Cost (USD million)		Outcomes and Indicators
Sustainable Fisheries systems	12.2	
Fisheries enterprises	10.35	
Institutional	9.06	

C)

	MAIN ASSUMPTIONS & SHADOW PRICES[1]				
FINANCIAL	**Output**	Annual Catch levels/ Trading volumes per Group/ Cooperative- Kg	Price (in ERN)	**Input prices**	Price (ERN)
	Small pelagic	75000	6	Fuel	30
	Inland fishing	6700	20	Ice	0.1
	alue addition	37500	58	urchases- wet weight (dry weight	5
	Dried fish trading	6250	70	Rural wage	60
ECONOMIC	Official Exchange rate (OER)	15	Discount rate (opportunity cost of capital)		10%
	Shadow Exchange rate (SER)/b	15	Social Discount rate		8%
	Standard Conversion Factor	1.00	Output conversion factor		1
	Labour Conversion factor	0.8	Input Conversion factor (only Ice) For Ice CF=		2

[1] All prices expressed in Local Currency (LC). See definition and formulas in the INSTRUCTIONS

b/ Fixed exchange rates in Eritrea including border pricing

D) BENEFICIARIES, ADOPTION RATES AND PHASING

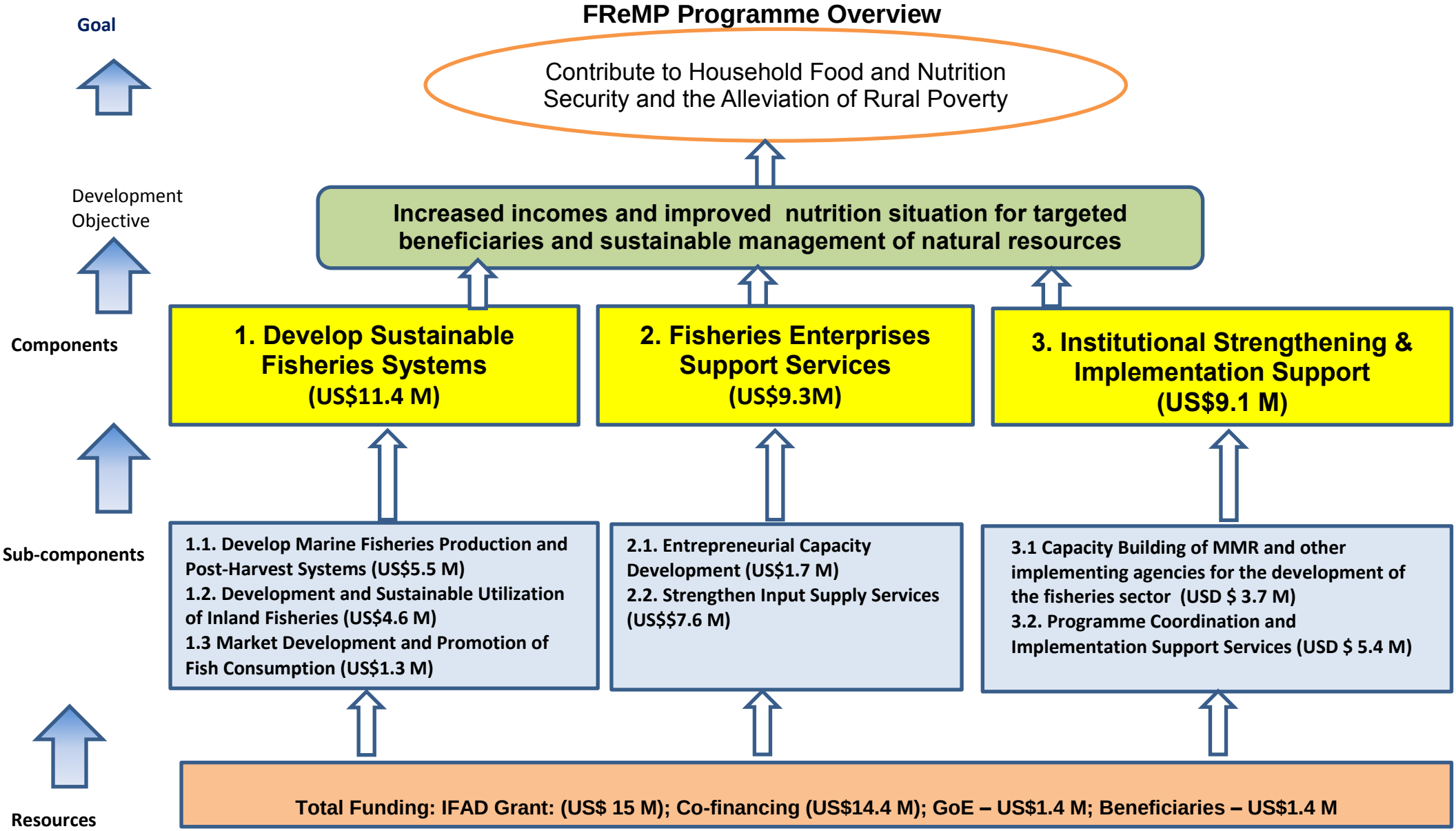
	PY1	PY2	PY3	PY4	PY5	PY6	PY7	Total	92%
Fishing co-operatives for small pelagic	100	450	450	400	100			1,500	
Adjusted (adoption rate)	*90*	*405*	*405*	*360*	*90*	*0*	*0*	*1,350*	*90%*
Fish processing (Value addition)	200	550	550	400	100			1,800	
Adjusted (adoption rate)	*180*	*495*	*495*	*360*	*90*	*0*	*0*	*1,620*	*90%*
Fish retailing co-operatives	5	10	10	0	0			25	
Adjusted (adoption rate)	*5*	*9*	*9*	*0*	*0*	*0*	*0*	*23*	*90%*
Fishing enterprise groups in dams.	15	15	150	100	0	0	0	280	
Adjusted (adoption rate)	*14*	*14*	*135*	*90*	*0*	*0*	*0*	*252*	*90%*
Capacity building beneficiaries	1,115	2,122	5,258	3,150	1,770			13,415	
Adjusted (adoption rate)	*1,115*	*2,122*	*5,258*	*3,150*	*1,770*	*0*	*0*	*13,415*	*100%*
								16,637	

E)

ECONOMIC ANALYSIS	NET INCREMENTAL BENEFITS						NET INCREMENTAL COSTS		
	Fishing co-operatives for small pelagic fish	Fish processing/ drying	Inland fishing	Fish trading	Incremental Benefits from NRM activities	Total Net Inc. Benefits	Economic Investment Costs ('000 lc)	Economic recurrent Costs ('000 lc)	Economic O&M Costs ('000 lc)
PY1	4	(1.1)	(0.06)	0.21	1.08	4	118	6	0
PY2	7	(2.5)	0.03	0.70	5.81	11	53	6	0
PY3	14	1.7	0.28	1.34	14.62	32	114	6	0
PY4	19	11.3	0.58	2.04	28.38	61	39	6	0
PY5	28	21.3	0.73	2.54	42.14	95	26	6	0
PY6	32	27.3	0.73	2.74	49.88	113	18	6	0
PY7	38	28.6	0.73	2.80	53.75	124	10	6	0
PY8	38	28.6	0.73	2.80	53.75	124	0	0	6
PY9	38	28.6	0.73	2.80	53.75	124	0	0	6
PY10	38	28.6	0.73	2.80	53.75	124		0	6

NPV@ 8 % ('million ERN)	**125**
NPV@ 8 % ('million USD)	**8**
EIRR	**17%**

FReMP Programme Overview



Logical Framework: Fisheries Resources Management Programme (FReMP)

Results Hierarchy	Indicator Name	Baseline	Mid-term	End Target	Source	Frequency	Responsibility	Assumptions
Goal: Contribute to household food and nutrition security and the alleviation of rural poverty	• Reduction in prevalence of chronic malnutrition (stunting)	• 50%	• 49%	• 47%	Global Nutrition Report 2015, RIMS baseline and impact surveys, household survey, MTR.	Programme start-up and completion	NPCO and Ministry of Health	Political, Social and Economic environment are favourable to the fishing and fish farming sector development (A); Macro-economy stagnates (R); Affordable fish products available in large quantities to poor consumers
	• Percentage increase in household asset ownership	• TV: 37% Radio: 61% Mobile phone: 69% Bicycle: 40% Horse cart: 23%	• 4% increase over baseline	• 10% increase over baseline				
Development Objective: Increased incomes and improved nutrition situation for targeted beneficiaries and sustainable management of natural resources.	• Number of HH receiving programme services • Percentage increase in annual net income of artisanal fishers, processors and traders • Hectares of land and mangroves under sustainable management • Increased fish consumption and dietary diversity	• 0 • 0 • Mangrove: 0 • Watershed: 0 • 0.4 kg per year	• 8,000 HH • 15% • Mangrove: 750 ha • Watershed: 7,000 ha • 0.7 kg per year	• 17.500 HH • 30% • Mangrove: 1,500 ha • Watershed: 16,000 ha • 1.5 kg per year	MMR Annual Reports; M&E Reports; MTR, PCR; Special Studies MMR Annual Reports; M&E Reports; MTR, PCR; Special Studies Food survey, MMR Annual Reports; M&E Reports; MTR, PCR; Special Studies	Annual Annual Annual	MMR and NPCO MMR and NPCO MMR and NPCO	Political, Social and Economic environment are favourable to the fishing and fish farming sector development (A); Macro-economy stagnates (R); Increased level of awareness on fish nutritional value and consumption, especially in the inland Zobas (A).
Outcome 1 Production systems for fisheries developed and delivering increased volumes of fish to consumers	• Average annual value of all fish delivered to consumers (USD):	• USD 0.6 million	• USD 15 million	• USD 50 million	Programme M&E reports	Annual	MMR and NPCO	Increased fish consumption, especially in the inland Zobas (A). Coastal ecosystems managed and improved.
	• Average annual volumes of all fish delivered to consumers (tonnes) Small pelagic (dry) Large fish (wet)	• Small pelagic: 260 • Large fish: 1,800	• Small pelagic: 2,000 • Large fish: 1,840 (marine large fish 1,800 and inland fish: 40)	• Small pelagic: 3,800 • Large fish: 3,100 (marine large fish 3,000 and inland fish: 100)	Food survey MMR data	Annual	NPCO, ZPCO	

Results Hierarchy	Indicator Name	Baseline	Mid-term	End Target	Source	Frequency	Responsibility	Assumptions
Outputs 1 1.1. Marine fishing cooperatives are established and receive adequate inputs	• Number of marine fishing (large fish and small pelagic) cooperatives supported	• Large fish: 37 • Small pelagic: 0	• Large fish: 40 • Small pelagic: 80	• Large fish: 67 • Small pelagic: 255	Programme M&E reports	Annual	MMR and NPCO	Supportive Policy and legal framework
1.2. Inland fisheries at the target water reservoirs established	• Number of watershed management plans above reservoirs established and effectively implemented • Number of inland fisheries cooperatives/enterprise groups established and operational	• 0 • 0	• 3 • 3	• 15 • 15	Programme M&E reports	Annual	MMR and NPCO	Supportive Policy and legal framework
1.3. Small pelagic fish processing/marketing cooperatives supported	• Number of viable small pelagic fish processing/marketing cooperatives handling 100 tons of fish loaded	• 0	• 30	• 90	Programme M&E reports	Annual	MMR and NPCO	Supportive Policy and legal framework
Outcome 2 Viable fisheries enterprises are developed and sustainable	• Number of viable primary fisheries enterprises[11] established • An umbrella cooperative for marketing small pelagic established and functioning profitably at the end of programme	• 41 • 0	• 80 • 1	• 250[12] • 1	Programme M&E reports	Annual	MMR and NPCO	Supportive Policy and legal framework
Output 2 2.1. Cooperatives/ enterprise groups established and receiving assets financing	• Percentage of cooperatives/enterprise groups receiving inputs from CCU	• 20%[13]	• 40%	• 80%	Programme M&E reports	Annual	MMR and NPCO	Supportive Policy and legal framework
2.2. CCU fully established at national and branch levels and providing services to members on a profitable basis	• Number of cooperatives receiving and servicing fishing assets through CCU	• 41	• 100	• 250	Programme M&E reports	Annual	MMR and NPCO	Supportive Policy and legal framework Capacity of CCU and cooperatives developed

[11]Fishing, processing, engine repair, net-making and marketing enterprises. Viable enterprises are sustainably operating enterprises without programme support.
[12]Total number of enterprises established is 358, estimated success rate 70%.
[13]It is estimated that about 20% of the cooperatives established under FDP are currently receiving inputs from the CCU on a credit basis.

I. Strategic Context and Rationale

A. Country and Rural Development Context

1. **Strategic Context** – More than two decades after attaining independence in 1993, Eritrea is still faced with many development challenges. The main economic sectors are yet to fully recover from the effects of 30 years of war, leading to a state of high unemployment, few income generating opportunities and general poverty. The situation has been worsened by periodic droughts which, given the country's dependence on rain-fed agriculture, make it highly vulnerable to food and nutrition insecurity. The country continues to face foreign exchange shortages, making it difficult to meet its import needs, thus forcing it to operate at lower levels of capacity. In addition, shortages of skilled manpower continue to hinder the country‘s development ambitions. In terms of the Human Development Index (HDI)[14], Eritrea was ranked 186th out of the 188 countries reported in 2015, while the country also scored poorly in the global hunger index (GHI)[15] with a GHI score of 33.8 in 2014.

2. Nonetheless, recent economic performance has been positive, driven mainly by the mining sector. Real Gross Domestic Product (GDP) growth is estimated to have increased from 2.0% in 2014 to 2.1% in 2015, double the rate in 2013. The current GDP composition is: services (59.9%), non-manufacturing (17.3%), agriculture, hunting, forestry and fisheries (16.9%) and industry (5.9%). Going forward, growth is expected to further benefit from a revitalised housing and construction sector, infrastructure development, and continued improvements in public financial management.

3. Although the majority of the population still rely on agriculture, animal herding and fishing for their livelihood and contribute about 20-30% of commodity exports (Agriculture Sector Strategy, 2014). These sectors are constrained by highly variable climatic conditions, inefficient traditional farming methods, limited resource allocation, and low profit margins. Moreover, private-sector activity, dominated by trade and services, remains weak, and access to hard currency is a major constraint. The fact that over 80% of the poor live in rural areas and depend on agriculture suggests that increasing agricultural production and productivity would have a significant impact on poverty.

4. The growth outlook is promising if Eritrea exploits all its opportunities for trade and opens to foreign investment other than in the mining sector. The country is aiming at creating a modern, private sector-led economy (Macro Policy 1994; National Indicative Development Plan 2014-2018)[16]. However, the attainment of this objective is still limited by an inadequate enabling investment and business environment, United Nations sanctions, and overall weak macroeconomic conditions. The Government of Eritrea (GoE) has placed high priority on building an efficient national government and developing its own capacities to manage policies and productively exploit the country’s abundant natural resources for sustainable socio-economic development (Ministry of Land, Water and Environment, 1997). Eritrea’s resources include arable land (26% of the total, but only 4% under cultivation) and minerals (copper, gold, iron ore, nickel, silica, sulphur, marble, granite and potash). Over the medium term, the Government sees further prospects in improved trade with Middle-Eastern and Asian countries, additional mining activities, growth of the food sector and the development of the tourist industry.

5. Exports are estimated to have grown in 2014-15, due to mineral production at the Asmara project, but the current account balance is estimated to have deteriorated from 0.2% of GDP in 2014 to -1.2% in 2015 and is forecast to be -1.5% of GDP in 2016. This is partly due to decreases in both remittances and the ‘development and recovery tax’ (a 2% tax levied on the Eritrean diaspora). Based on the International Monetary Fund (IMF) Article IV 2009[17], Eritrea is a pre-decision point Highly Indebted Poor Country (HIPC) and is therefore eligible or potentially eligible for HIPC Initiative multilateral debt relief (MDR). However, no discussions on an IMF-supported programme have been

[14] The Human Development Index Report is produced by UNDP (2015): http://hdr.undp.org/en/2015-report
[15] GHI is produced by the International Food Policy Research Institute and is an aggregated measure of four key indices, namely; overall undernourishment, child wasting, child stunting and child mortality: http://www.ifpri.org/topic/global-hunger-index
[16] African Economic Outlook; AfDB, OECD, UNDP 2015.
[17] http://www.imf.org/external/np/pp/eng/2013/071813.pdf; Only 2009 information is available from IMF, because since then there has been no agreement on mission dates and modalities for the next Article IV with the Government of Eritrea.

initiated, although the Government is engaged with the IMF's capacity-building institute through the East African Regional Technical Assistance Centre (E-Afritac), located in Tanzania, and has also agreed to participate in the African Development Bank's Transition Support Facility.

6. The medium-term outlook could present some risks because of the size of the fiscal and current account deficits, coupled with high inflation. Improved management of these conditions and enhanced control of the exchange rate regime and public debt could attract more private investment. Thus, medium-term economic prospects will be influenced by: a) tensions over the border with Ethiopia, which are a basis for high security infrastructure expenditure; b) relations and co-operation with the international community; c) implementation of the regional programme on drought resilience and sustainable livelihoods under the Intergovernmental Authority on Development (IGAD), plus capacity building under the African Development Bank's new Transition Support Facility; d) increasing investments in the mining sector; and e) continued engagement with Middle-Eastern and Asian countries.

7. With regard to poverty in Eritrea, the analysis indicates that it is most severe in the coastal plains, where high temperatures and lack of water constrain agricultural development. Although the coastal area was once home to a strong fisheries sector, decades of war brought the sector to the point of collapse. The poor were disproportionately affected by the war and by drought and many have struggled to re-establish their livelihoods having lost assets, such as boats and livestock. Nutrition has been recognized as a major development issue of which up to 50.3% of children below 5 years are reportedly stunted, while 38.8% are underweight and 15% suffer from wasting[18]. The high rate of teenage pregnancies (19%) with the consequence of a high rate of low birth weight babies (14%) are strong determinants of stunting. Hygiene and sanitation are other important contributors to the high stunting rate. Improved drinking water supply is only realised for 27% of the population. This, on top of inadequate management of diarrhoea, puts children at risk of nutrient loss and thereby having an impact on nutritional outcomes. Not only chronic undernutrition but also acute undernutrition (wasting) is an issue in the country with a rate of 14% of children under five years of age affected. This is an alarming figure and far above the cut-off point for a nutritional emergency. The other determinant of undernutrition is food insecurity. Food insecurity in Eritrea is attributed mainly to climate-related factors that affect the people's capacity to produce enough food. But, there are also technological, policy, demographic and macro-economic issues that need to be addressed to have a lasting impact. Fortunately, the country has abundant and under-exploited fisheries resources, both in its marine waters in the Red Sea and potentially in inland water reservoirs, which could greatly contribute to, and diversify, national food security, reduce the incidence of poverty and malnutrition, and create employment opportunities.

8. The scarcity of reliable statistics makes it difficult to establish the country's rural poverty situation with certainty but based on different reports, including the Interim Poverty Reduction Strategy Paper (I-PRSP), it is clear that over 60% of the rural population are poor and at least 30% live in extreme poverty. However, interventions by the Government and its development partners have been contributing variously to improve some aspects of people's lives. Life expectancy at birth is now estimated at 62.3 years, up from 50 years only a decade ago. The overall improvement emanating from government and development partners' programmes is reflected in the country's performance concerning the achievement of the Millennium Development Goals (MDGs). It is estimated that the country performed well with regard to three of the eight UN MDGs19 and these include: a) MDG 4 – Reduction of Child Mortality; b) MDG 5 – Improvement of Maternal Health; and MDG 7 – Ensure Environmental Sustainability. However, the country has made less progress towards the eradication of extreme poverty and hunger (MDG 1) and the attainment of universal primary education (MDG 2). Though adult literacy has improved, enrolment and retention indicators continue to lag behind. Despite significant advancements made towards gender parity (MDG 3), substantial improvements, particularly with regard to female representation in the workforce and in national assembly, are still needed to meet this target. Lack of data has made it difficult to assess progress made towards MDG 8 – Global Partnership for Development.

[18] Eritrea's Demographic Population Survey (EPHS, 2010).
[19] United Nations Development Programme (UNDP) in Eritrea.

9. **Policy and Institutional Context** – The Eritrean Constitution and macro-economic policies provide the wider policy and legal context for the development of the fisheries sector. The Government has set out specific policies, strategies and programmes for the marine capture fisheries, within the context of the macroeconomic policy. The Interim Poverty Reduction Strategy Paper (I-PRSP) has the following strategic objectives and priorities for the fisheries sector: a) increasing the profitability of artisanal fisheries by strengthening their cooperatives, linking them to high-value export markets, and reducing their costs of operation; b) boosting export earnings, by creating a suitable investment climate that will attract both national and foreign investors and enhancing profitability of industrial fishing; and c) strengthening resource management for sustainability to catalyze private investments, and protect the environment. The policy goal is the long-term sustainable utilization of fisheries resources for the benefit of Eritrea and its people. The objectives are: a) the provision of employment opportunities for the coastal population; b) improvement of the livelihoods of small-scale fishers; c) enhancement of food security; d) increase in foreign exchange earnings, through export of high value fish and fish products, principally to the regional and European markets; and e) sustainable and balanced use of fisheries resources.

10. FReMP will support policy review with respect to: a) sustainable production; b) marketing; c) management; and d) analysis of the impact of current policy with respect to alternative marketing system, legal and regulatory frameworks. In particular, FReMP will support the review of: a) Fisheries Proclamation No. 176/2014; b) Proclamation No. 105/1998; c) Legal Notice No. 38/1998; d) Legal Notice No. 39/1998; e) Legal Notice No. 40/1998; f) Legal Notice No. 41/1998 and Legal Notice No. 42/1998. There will be need, specifically, to address and review the policy on aquaculture development plan to address the issues of scaling up and marketing with respect to both cooperative societies and involvement of the private sector players. Even though it is generally agreed that a number of institutions will play an important role in FReMP, there is weak policy linkages between them and MMR and hence FReMP will support the development of a framework for involving the relevant public and private institutions.

11. **Socio-Political Context** – After a 30-year war to win freedom from Ethiopia, Eritrea gained de facto independence in May 1991 and formal independence two years later. Following independence, the country enjoyed strong economic growth and made improvements in health and education. However, following the border war with Ethiopia during 1998-2000, the ongoing "no-war-no-peace" situation has continued to challenge the Government's development efforts. In 2002, the Eritrea-Ethiopia Border Commission (EEBC) ruled the border dispute, over the town of Badme, in favour of Eritrea. However, the decision is yet to be implemented. In December 2011, the UN Security Council imposed sanctions on Eritrea (Resolution UNSC 2023/2011) whose impact is increasingly hampering ordinary financial transactions, tourism and travel services to and from Eritrea. These are critical sectors of the Eritrean economy as the country heavily relies on Diaspora remittances and tourism, on top of mining. Eritrea continues to be classified as a country in fragile situation, due to persistent obstacles of an unsettled border crisis with Ethiopia and a series of droughts that, when they hit, tend to leave devastating impacts. Since independence in 1991, Eritrea has undergone a period of great difficulty in developing the institutions of an independent state under severe resource constraints, exacerbated by these two major crises.

12. **Environment and Climate –** While Eritrea is endowed with significant coastal and terrestrial natural resources, poor management has led to a continuous decline in their quality and availability. Soil erosion is a major issue in the highlands, which also affects the coastal ecosystem through increased sediment flows from the highlands into the vulnerable coral and mangrove areas. Mangroves have a critical function to protect the marine ecosystem, and serve as breeding site for fish. Mean annual temperatures have increased by 1.6 °C since 1960[20] and are expected to increase further by 1.1 to 3.8°C by the 2030s. Critical heat tolerance thresholds for major cereals may be exceeded, significantly impacting food security. Reduced soil moisture could decrease availability of grazing land, thereby affecting the livestock sector. Seawater temperatures have risen accordingly, causing prolonged coral bleaching events and probably affecting fish stocks, though detailed information is lacking. Sea-level rise is expected to be between 8-12 cm by the 2030s and up to 50

[20] Eritrea's Second National Communication to the UNFCC, 2012.

cm by the end of the century, evidencing the need for longer-term planned adaptation in the coastal areas.

13. **IFAD's Strategy in Eritrea** – The IFAD Country Programme has been defined by two Country Strategic Opportunities Programmes (COSOPs); the last one was prepared in 2006. The features of the Country Strategic Note (CSN), covering the proposed new investment period (PBAS 2016-2018), are: a) Refocus IFAD's strategic framework in the country from post-crisis to structured development; b) Prioritize IFAD future interventions in areas where it has developed a lead position (i.e. agriculture and fisheries sectors). These are two areas where IFAD has generated considerable experience over the years and, therefore, has comparative advantage vis-à-vis other sectors of the economy in Eritrea; c) IFAD supported operations in Eritrea will continue to be fully embedded in the Government budget framework and continue to use government systems for implementation. During the CSN period and beyond, agriculture and fisheries will continue to be regarded as key pillars of IFAD's comparative advantage in Eritrea. In addition, IFAD financed Programmes/Projects will continue to play a catalytic role both in the agriculture and fisheries sectors. The CSN also takes note of issues related to climate change and the environment, gender, HIV/AIDS, rural development, food and nutrition security and capacity limitations/challenges at different levels of the decentralised government structure

B. Rationale

14. Eritrea has substantial and relatively underexploited marine and fisheries resources, comprising nearly 1,000 fish species that have been underutilized for decades. These exist in an unpolluted, underexploited and under-capitalized marine environment. The fisheries sector contributes to about 3% of the country's GDP. The Maximum Sustainable Yield (MSY) of Eritrea Red Sea fisheries has been estimated by several sources at about 80,000 tonnes per year. However, recorded catches rarely exceed 10,000 tonnes, of which less than 2,000 tonnes is from small-scale fisheries. There is evidence from historical stock assessments that the MSY for the small pelagic fish is between 24,000 and 50,000 tonnes per year. FReMP will support MMR to ensure these marine fisheries resources are used sustainably. To do so, the Programme will adopt the *precautionary approach*, a widely used approach that is based on exercising prudent foresight to avoid untainable situations, taking into account that "changes in fisheries systems are only slowly reversible, difficult to control, not well understood, and subject to change in the environment and human values"[21]. Specifically, FReMP will: a) set conservative target catch levels below historical MSY estimates (about 19,000 tonnes per year for small pelagics); b) support MMR's monitoring and enforcement capacity; c) update MSY estimates and adjust targets where needed; and d) invest in restoration and protection of the ecosystem.

15. This total production represents an estimated gross first sale value at landing of about USD 50 million. This level of production comes with huge investment potential in fishing, processing and other support services, like boat building, supply of fishing gear, cold storage, production of ice and packaging material, up-country opportunities in fish distribution and marketing, etc. There is also a high potential for tourism in the islands, coastal and marine environment, which have large areas of unique coral reef, containing nearly 220 species of coral and rare ornamental fish species (FReMP has a different focus and will not, therefore, invest in this aspect). The mangrove forests also offer opportunities for supplementing livelihoods, with honey production and fodder for small stock. Nevertheless the health of the mangrove forests is essential to the coastal ecosystems, a contribution to livelihoods in terms of fodder and fuelwood, and the viability of the fisheries in the medium and long term.

16. The Eritrean fishery consists of both small scale and industrial fishing operations. The small-scale fishers in the coastal areas consist of small scale fishers using boats and canoes, foot fishers (mainly women and youth) and also crew members. By definition, small scale fishers are traditional fishers involving fishing households, using relatively small amounts of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption. Artisanal or small scale fisheries can be subsistence or commercial, providing for local consumption or export.

[21] See http://www.fao.org/docrep/003/w3592e/w3592e07.htm

17. The target group is located in the villages along the Red Sea Coast in Zoba Northern Red Sea (ZNRS) and Zoba Southern Red Sea (ZSRS), and who are linked to the landing sites where they deliver fish. Those fishers are using traditional motorized wooden boats (Houri: traditional wooden boats with outboard petrol engines, and Sambuks: wooden boats with inboard diesel engines) and a limited number of fishers using improved motorized fibre-glass boats and hence classified as small scale fishers. The small-scale fishers operating motorized boats are registered and their number has been estimated at about 3,300, of which 1,112 belong to the fishers' cooperatives. The registered small-scale fishers own about 793 boats of which 602 (76%) are owned by the cooperative members. A major limitation of these boats is their small size with a capacity of 0.5-1.0 tonnes. Their small size also limits the fishing range and the quantity of catch per trip. Most of the boats are currently not functional either due to age, lack of maintenance as a result of shortage of spare parts, inadequate gear, infrequent supply and high cost of fuel. Some of FReMP beneficiairies are "foot fishers" with no fishing assets. FReMP will address many of these limiting factors and contribute to increased productivity, production and improved livelihoods of the target beneficiaries.

18. Inland fisheries and aquaculture present another investment area to increase fish production, incomes and nutrition, especially in the rural inland Zobas (Regions). GoE, with support of other development partners, has invested adequately in the construction of water retention dams in the inland Zobas, many of which have sufficient water volumes and other ideal conditions for raising fish. Over 330 reservoirs have been established, of which 70 are stocked with different fish species, mostly tilapia, carp and catfishes. MMR has assessed some of these reservoirs and determined that the fish are well established, productive and achieving good growth. However, the fisheries resources are hardly exploited at the moment, due to lack of skills and equipment by local communities, and partly because fishing is not their tradition. This can be changed through awareness creation, provision of skills and fishing equipment. In addition, there are prospects for investments in aquaculture using cages placed within the water reservoirs, or in external ponds drawing water from the reservoirs. FReMP will intervene in these areas to increase not only the target group's incomes, but also improve their food and nutrition security through increased availability of fish. It is projected that about 100 tonnes of fish per year will be produced from the water reservoirs supported by FReMP; the 71 stocked dams in the country can produce approximately 350 tonnes of fish per year. Once again, the inland fisheries are potentially vulnerable to the deterioration of ecosystems in the watersheds above the reservoirs – where the Programme will assist in developing climate resilient conservation plans that will have the ancillary benefits of improving crop and livestock production and, thus, nutrition and incomes.

19. There are also prospects for mariculture in the Red Sea, especially for marine species, such as oysters, groupers, sea breams, mullet and milkfish. This needs to be supported with research evidence on practical technologies for culturing the species and determining the required level of investment that is technically and economically viable for the small-scale sector. Once the technical and economic viability are established, then there are opportunities for investment in fishing, fish processing and marketing as well as supplying fishing inputs, including fingerlings and fishing gear.

II. FReMP Description

A. FReMP Area and Target Group

20. **Geographic Targeting –** FReMP will be national in scope targeting all six Zobas including the coastal areas covered under the Fisheries Development Project (FDP) and inland areas, particularly targeting water reservoirs for aquaculture and up-country fish markets. Eritrea's fishing area is about 120,000 km^2 Exclusive Economic Zone (EEZ), of which the country's territorial waters cover 55,000 km^2. There are more than 350 islands, although only a few (estimated at 10) are inhabited. Some 50 km^2 are covered with mangroves, and some areas have been designated as Marine Protected Area For operational purposes, landing sites spread along Eritrea's 1,350 km long coastline will be the entry points for the FReMP's investments in the coastal zone. The coast line is divided into two Zobas: ZNRS and ZSRS. There are a total of eight landing sites most of which are well established with good infrastructure. These include: Massawa (Ghibi), Massawa (Erifish), Dahlak, Galaelo in ZNRS; and Assab, Tio, Eddi, and Barasole in ZSRS. In the inland Zobas (Anseba, Debub, Gash Barka, and Maekel), the Programme will be site-specific and will operate in areas with selected dams,

principally to promote effective and sustainable inland fisheries to boost household incomes and nutrition for rural populations. It will also engage in promotion activities to raise the level of fish consumption by rural and urban households.

21. With regard to selection of the inland water reservoirs for the inland fisheries activities, the following will be considered: a) high potential for fish production; b) low risk of drying out; c) high opportunities for community participation; d) accessibility (as indicated by the presence of a community of potential users); and e) the degree of watershed conservation and/or on-going watershed conservation activities. Emphasis should be put on good water inflow and balance as critical consideration for dam fisheries. At least a minimum depth (approximately 7 metres) should be maintained throughout and this needs to be agreed by the various water users. Also consideration should be given to safety for fishing activities. These aspects will be incorporated in the dams and watershed management plans.

22. **Target Group** – The target group of the Programme consists of: a) small-scale fishers (i.e. men and women that are either small boat owners, crew members, foot fishers[22])) that will be dealt with either as individuals or as cooperatives/groups; b) rural smallholders (non-fishers mainly involved in subsistence agriculture and keeping small livestock) living around the target water reservoirs in inland Zobas and interested to engage in economic activities along selected links of the inland fisheries supply chain. This group also includes smallholders living and involved in rehabilitation of the catchment areas of the target water reservoirs; c) youth entrepreneurs (fishers and non-fishers) interested in establishing business enterprises/cooperatives to respond to market demand for fishery products and services; d) women and women headed households (WHHs), accounting for at least 30% of the Programme's beneficiaries; and e) demobilised soldiers and Internally Displace People (IDPs).

23. *Small-Scale Fishers* – This target group consists of small-scale fishers in the coastal areas using boats and canoes, foot fishers (mainly women and youth) and also crew members. The target group is located in the villages along the Red Sea Coast in ZSRS and ZNRS, and linked to the landing sites where they deliver fish. Those fishers are using traditional motorized wooden boats (Houri: traditional wooden boats with outboard petrol engines, and Sambuks: wooden boats with inboard diesel engines) and a limited number of fishers using improved motorized fibre-glass boats. FReMP will provide support to small boat owners, organized in cooperatives. Support will also be extended to those fishers belonging to the lowest income group, targeting particularly asset-less people, such as crew members, foot fishers who will be facilitated to organise themselves into groups and will be sharing the assets as well as the earnings.

24. *Rural Smallholder Households* – The target group comprises low income households of communities living around the target water reservoirs. They engage mainly in rain fed agriculture, using inadequate production practices, although some are engaged in irrigated agriculture. The lowest income groups are smallholders cultivating only rain fed crops and have smaller plots of land. The Programme will facilitate participation from community members living in the catchment areas around the target water reservoirs.

25. *Youth* – The youth represent about a third of all citizens in the country and its mobilisation on the labour market is of concern, particularly in the rural areas. Migration of rural youth to urban areas is of great concern and identification of viable economic opportunities is of great importance. The Programme will promote employment opportunities for youth through the creation of groups to engage in micro and small enterprises (MSE) in fish and fish products in coastal and inland communities. The Programme will include approximately 5,000 young men and women (30% of total Programme beneficiaries).

26. *Women and Women-Headed Households (WWHs)* – The cultures and traditions of all the ethnic groups in Eritrea[23] constrain the socio-economic activities of women, particularly in rural areas, though change is underway. Women, by tradition, largely remain within the home and village and are

[22] Foot fishers are small scale fishers who access the fishing grounds on foot and catch fish mainly for subsistence purposes.
[23] Afar, Bilen, Hidareb, Kunama, Nara, Rashaida, Saho, Tigre and Tigrinya.

responsible for domestic chores, including fetching water and firewood and caring for the children. Women also have lower literacy/numeracy rates; about 40% of girls leave school at an early stage to get married. The Programme will support women and, in particular WHHs, to increase their incomes through value-addition and marketing in the fisheries. As an incentive for inclusion of WHHs in cooperatives, proposals presented by aspiring cooperatives with membership that includes at least 30% WHHs would receive preferential consideration.

27. *Internally Displaced People (IDPs) and Demobilised Soldiers* – IDPs and returnees are resettled in existing villages or new settlements without or limited access to land, livestock or off-farm employment opportunities. They are considered as the most disadvantaged in society, together with demobilised soldiers. FReMP will facilitate their organisation, capacity building and linkage to the appropriate financing mechanisms so as to engage in meaningful income generating activities and improve their livelihoods.

28. The total number of FReMP's direct beneficiaries is about 17,500 households of fishers and non-fishers; this corresponds to 87,500 people (using a national average of 5 people per household) and about 300 MMR staff. Of the total beneficiary households, about 10,000 households will be in the 11 targeted sub-Zobas in the coastal Zobas and 7,500 households in the inland Zobas. Beneficiary households will receive benefits from participating in the different FReMP interventions aimed at achieving the Programme's development objective. Benefits will emanate from: a) income generated from fishing and related economic activities (handling, processing, storage, marketing, net making/mending, engine repair, etc.); b) improved nutrition and food security; and c) eco-system management interventions in the mangrove areas (1,500 ha) and above the inland reservoirs (covering an estimated 17, 000 ha) from which households will derive direct benefits (in the mangrove areas, within the catchments and in irrigation schemes downstream – where relevant) as well as underpinning the viability and sustainability of the fishery activities in the sea and around the target water reservoirs. There will also be large numbers of indirect beneficiaries, primarily the large population living around and beyond the Programme area. Nationwide, consumers will benefit from more, affordable and better quality fisheries products. The fisheries industry service providers will benefit from increased service and input demand.

29. **Targeting Mechanisms** – The targeting mechanism will seek to ensure equitable participation in, and benefits from, Programme activities. FReMP will use a variety of mechanisms to enable the target households and the vulnerable (i.e. WWH) to access Programme benefits. The targeting strategy will be guided by the following targeting mechanisms: a) self-targeting measures to ensure that Programme interventions respond to the priorities and livelihood strategies of the target groups. The strategy will also ensure that selected entrepreneurial activities are suitable for all groups, in particular women and the youth (young boys and girls); b) direct targeting mechanism, will ensure that specific groups, particularly the vulnerable and disadvantaged (such as women, WHHs, IDPs and demobilised soldiers) are selected to participate in Programme interventions. The Programme will include quotas to ensure their inclusion (not less than 30% for women inclusion); c) enabling measures – these are measures that are inclusive and involve a consultative process to ensure full outreach to target communities; and d) empowering measures – in addition to developing technical skills in fishing and related fishing activities and enterprises, the Programme will support beneficiaries to develop skills in household nutrition, basic literacy and numeracy, business and leadership, especially for women and young women. Women's involvement in activities should, ultimately, result in increasing their economic, as well as social, empowerment. The Household Methodology will be applied to, among others, promote fish consumption and improve dietary intake at household level and therefore to accelerate benefits to the target group. The Programme will employ inclusive targeting mechanisms to ensure the participation of low income and vulnerable households with a specific focus on poor rural households whose livelihoods revolve around the use of the natural resources of the coastal area of Red Sea as well as dams in the highland and low lands.

30. **The gender strategy** aims at providing equal opportunities for women and men to participate in and benefit from development of the marine and inland fishery sector through FReMP activities. Women are specifically targeted to account for at least 30% of beneficiaries and one target group comprises young women (accounting for 15% of total beneficiaries). The Programme will support women, and in particular WHHs, to increase their incomes through value-addition in the fisheries

sector with a specific focus on processing and through micro-businesses. development of a Gender FReMP will develop a Gender and Youth Action Plan as a road map to operationalize gender and youth focus under different components. Women heads of households and women in male-headed households, including young women, will be empowered to build small businesses or effectively engage in fishing related activities (i.e. processing and marketing, net making and mending). Their membership and leadership in cooperatives will be encouraged. Measures are included to ensure that women benefit from Programme interventions. Such measures include, for example, priority of financing proposals for Cooperatives that have at least 30% women heading households as members. Climate-smart investments will support the use of labour-saving technologies, such as solar fish driers. Furthermore, through construction of fish processing plants, the Programme will facilitate access to water and this will be benefit to women. Household methodology will stimulate discussions at the household level regarding workloads which, invariably, result in an improved allocation of tasks between household members.

B. Development Objective and Impact Indicators

31. **Goal and Objective** – FReMP will be implemented over a seven-year period, from 2017 to 2023. The Programme's **Goal** is to "*contribute to household food and nutrition security and the alleviation of rural poverty".* **The Programme Development Objective** is: *"Increased incomes and improved nutrition situation for targeted beneficiaries and sustainable management of natural resources"*.In pursuit of this objective, FReMP will support the marine and inland small-scale fishers to produce a surplus, within the maximum sustainable yield of the fisheries, for the market and forge sustainable partnerships and linkages with various actors along the fish production and marketing channel. The focus will be on transforming the small-scale fisheries sector in Eritrea from subsistence to a sustainable commercial sector[24]. The Programme contributes to all the CSN objectives, especially to Strategic Objective I – Access to and use of climate-smart technologies and services for enhanced productivity, profitability and sustainability of smallholder agricultural and fisheries systems through increased resilience and adaptation capabilities to climate change.

32. **Impact Indicators –** FReMP is expected to facilitate the development of sustainable production and market linkages for marine and inland fisheries and deliver increased volumes of fish to consumers, through increased production, processing and marketing of different fish products. This will contribute to increased incomes of small-scale fishers in the coastal and inland communities; increased volume and quality of marketed fish in coastal and inland areas; and enhanced food and nutrition security in the target communities. Main impact indicators at the goal level are: a) 10% reduction in rate of child stunting; and b) 10% increase in household asset ownership. Progress towards the achievement of the Programme Development Objective will be measured using the following indicators: a) at least 30% increase in fish production for small-scale fishers; b) at least 30% increase in incomes of fish-related enterprises for small-scale fishers, fish processors, and fish traders; and c) 1,500 ha of watershed and 16,000 ha of mangrove unser sustainable management.

C. Outcomes/Components

Outcomes

33. The Programme aims at achieving two complementary outcomes:

a) Outcome 1: Production and market linkage for fisheries (marine and freshwater fisheries) developed and increased volumes of fish delivered to consumers; and
b) Outcome 2: Viable fisheries enterprises are developed and requisite inputs are accessed on a sustainable basis.

[24] Subsistence fishing refers to fishing activities targeting household food with very limited sale of the catch as opposed to commercial fishing that mainly target income but may make provision for household food. Even though both fisheries are referred to as small scale fisheries.

Components

34. FReMP's outcomes will be achieved through the effective implementation of two technical components which are subdivided into five subcomponents supported by capacity building and implementation support services.

35. **Component 1: Develop Sustainable Fisheries Systems (USD 11.4 Million) –** The component will support the establishment of necessary infrastructure, and technologies for production and post-harvest operations, marketing and consumption of both marine and inland fisheries. This will be achieved through a set of three subcomponents.

36. ***Subcomponent 1.1: Develop Marine Fisheries Production and Post-Harvest Systems (USD 5.5 Million)*** – The subcomponent will focus on putting infrastructure and technologies in place for the effective and sustainable production of fish and fish products that would be linked to markets. Eritrea's marine fishery sub-sector includes cold and dry fish production and market linkages supplied by industrial fishery[25] (mainly licensed foreign fishing vessels) and artisanal fishers operating at least four types of fishing boat technologies. The cold supply chain is well established and deals with large pelagic fish and demersal species, including commercially valuable reef dwelling fish, such as groupers, snappers and emperors. The demersal fish include lizardfish and breams, while the large pelagic fish include jacks, trevallies, mackerels, tunas and sharks. The dry fish supply chain handles mainly the small pelagic sardines and anchovies, but is poorly developed following years of conflict from which it has not fully recovered. The Programme will address some of the major development challenges facing the country's marine fishery sub-sector at both production and post-harvest levels. At the production level, the country has not fully re-built its national fishing fleet following years of conflict and does not have enough capacity to fully utilize its EEZ. This affects both the large pelagic and demersal fish entering the cold supply chain as well as the small pelagic fishery destined for the dry fish supply chain.

37. At postharvest level, the fishery infrastructure at landing sites is not adequate to accommodate all the landed fish and, in particular, electricity is only available on a few landing sites, this limits the capacity to produce enough ice for the cold supply chain. Some of the landing sites presently need infrastructure rehabilitation and upgrading. The processing, distribution and marketing activities in the cold chain are dominated by a single player, the National Fishing Corporation (NFC), who plays a big role in market and price decisions. This situation is disantavageous to women who tend to be mostly engaged in processing and marketing. Futhermore, the dry fish production and market linkage is poorly developped with only only one small establishment processing the small pelagic fish for the production of fishmeal destined for the animal feed industry; there is no formal processing and distribution/marketing channel for human consumption. Lack of postharvest processing facilities to appropriately process/preserve catch, thus, limits the longevity of the product, results in poor fish quality and increases wastage. This is compounded by lack of accredited fish quality laboratory which could enable fish exports.

38. FReMP interventions will take place mostly at landing sites along the coast, but some activities will extend higher up in the supply chain – for instance to distribution and retail levels. While FReMP has a strong focus on small pelagic fisheries, it will continue to support activities for the large fish species (higher value traditional artisanal fisheries). The interventions under this subcomponent are expected to focus on: a) ice-making facility for the cold fish supply chain; b) fish drying facilities for the small pelagic fish; c) Pilot Mobile Solar Fish Dryers; d) establishment of multi-purpose facilities at three centres to facilitate business services delivery; e) innovative fish-based value addition technologies and product development, and; f) formation of an umbrella cooperative[26] for the purpose of national distribution and marketing of small-pelagic fisheries.

[25] Typically, the goal of an industrial fishery is to catch as many fish as possible for economic gain. This carries with it various risks of overfishing of a fish population, causing the fishery to 'crash', among several other dangers. The size of the boats used is usually on the larger end with the commensurate amount of capital invested per man-on board.

[26] The umbrella cooperatives is envisaged to become independent and run as a private enterprise, thereby taking control of the dry fish production and market linkage, requiring minimal investment in transportation system and network. The Production and market linkage Function Analysis proposes establishment of the umbrella cooperatives through savings.

39. *Establish Ice-Making Facility at one Fish Landing Site to Support the Cold-Fish Production and Market Linkage* – The cold fish production and market linkage has received development assistance from the Government and development partners, including IFAD through the Fisheries Development Project (FDP). This has contributed to improvements in fisheries infrastructure at the major fish landing sites, such as Massawa, Assab, Gellalo, Tio and Eddi. However, the facilities would not be sufficient to handle the expected increase in fish production resulting from Programme interventions. In particular, there will be increased demand for ice by additional fishers supported by the Programme. FReMP will aim to lessen this gap by supporting the construction of one ice making facility with capacity to produce at least 24 tonnes of ice per day and with fish cold storage rooms to hold fish before transportation to inland markets. MMR, in consultation with other key stakeholders, such as the NFC and fishers' cooperatives, will determine the most appropriate location for the new investment. Other factors to be considered include: a) the targeted volumes of fish to be landed on the site; b) strategic location at a reasonable distance from other similar facility; and, c) availability of electricity on the site. A business and sustainability plan will be developed for the ice making facility to ensure it can be run on sound business principles. The plan should clearly define the ownership/lease arrangements. FReMP support will include training personnel for efficient operation of the ice making facility.

40. *Construct Solar Fish Drying Facilities at Four Landing Sites to Handle Increased Volumes of Small-Pelagic Fish* – FReMP has a strong focus on the dry fish production and market linkage. The interventions under the Programme are expected to result in increased output of high quality dried pelagic fisheries, especially for human consumption. The small fish are traditionally dried in Eritrea by spreading it out in the sun on a sandy beach. Open air sun-drying, a common practice in many other developing countries, leads to poor quality products as fish is exposed to dust, rain and wind, soiling, contamination with microorganisms and possible infection with disease-causing germs.

41. FReMP will intervene by constructing solar fish drying facilities for the small pelagic fish at strategic points along the coast. These will be established at four landing sites, of which one site will be in ZNRS and three sites in ZSRS, where there is more intensive fishing of small pelagic fish. The proposed sites are Dahlak in ZNRS and Tio, Eddi and one other site to be identified in the ZSRS. MMR, in consultation with other stakeholders and using the most current fish production data, will identify the ideal sites and the land lease related issues. FReMP will provide Technical Assistance (TA) support for the design, specifications and installation of the solar drying facilities. Other options to consider include technical partnerships with specialized United Nations technical agencies in this field, such as the United Nations Industrial Development Organisation (UNIDO), Food and Agricultural Organisation (FAO), etc. to provide the needed technical expertise.

42. In addition, the Programme will support the enabling facilities and services for hygienic fish processing, including access to piped water and sanitary facilities at the targeted landing sites and proper fencing of the facilities to keep off predators. Supply of piped water to the landing sites will have additional public utility benefits to the communities in the neighbourhood. To maximize the gains from improved drying technology, there will be need for changes in services and practices in other aspects of this supply chain, including storage and transport facilities, improved hygienic conditions of fishing boats, better product handling and improved packaging.

43. *Pilot Mobile Solar Fish Dryers in Smaller/Temporary Fish Landing Sites* – Small pelagic fishes are generally migratory in nature. Accordingly, fishers may be expected to move in between the major landing areas for significant periods. While the big landing sites will continue to receive most of the fish on a continuous basis, there is a need for smaller mobile fish drying facilities that fishers can set up on particular sites temporarily for relatively short durations and shift with them to other fishing areas along the coast. These may be in form of light solar racks covered by Ultra Violet-treated solar tents. Detailed designs will be produced to reflect the local situations and scale of fishing operations. FReMP will support such facilities for operation in five smaller fish landing sites. The design of the mobile solar fish drying rack will take the following into account: a) low cost technology, which is easily replicable and adaptable to different local situations; b) use mostly local materials and can be readily fabricated and mounted; c) light but adequately sturdy material and frames; d) easy to clean in order to maintain hygiene standards; e) should not destroy product flavour and other desirable properties; and f) durable with a use life of at least two years. MMR Zoba branches will manage the pilots and will define ownership or leasing arrangements for demonstration facilities which can allow their use by

fishers and fish processors cooperatives. Following successful demonstration of mobile solar fish dryers, additional facilities can be constructed on a needs basis as required by users. The Programme has made provision for such cooperatives to access asset financing through which they can acquire the facilities as their private business assets.

44. *Establishment of Multi-Purpose Facilities at Three Centres to Facilitate Business Services Delivery* – Multi-purpose facilities for consolidated fisheries operations and services under one roof was implemented during FDP at four landing sites. It has proved to be very useful in terms of ease of service delivery, exchange of information and complementation of activities. FReMP intends to build on this successful experience by supporting the establishment of three additional multi-purpose facilities on fish landing sites but with a particular focus towards the small pelagic fishery, which was not included under FDP. Furthermore, these will be the landing sites that did not benefit in this regard from FDP. Each of the multi-purpose facilities will comprise: a) a facility for net making/repair to be operated by women enterprise groups; b) a facility for boat engine repair to be operated by youths trained in this trade; c) a store for CCU supplies to be managed by the CCU Zoba branch; d) an office for the fisheries extension/inspection agent; e) housing/accommodation for the extension/inspection agent; and f) a facility/room for training. The arrangement to have extension agents, CCU operations and the new enterprise groups under the same roof will provide opportunities for capacity building, faster processing of input financing and to readily and more conveniently access relevant services. More significantly, the women groups making nets can readily sell their products through the CCU retail stores within the same complex. The facility will be developed with a clear business plan detailing the ownership/lease arrangements and means of financing, possibly in form of rent payments by the business units operating within.

45. *Undertake Pilots of Different Processing/Value Addition Technologies* – The small pelagic fisheries has presented FReMP with opportunities of introducing new techniques and preparation of innovative products and recipes. Under this subcomponent, such innovations will be piloted to test the viability of the production processes, assess the market potential and economic viability of the products. The techniques and fish products to be piloted include solar-dried assortments, pickling, fish powder, protein concentrates, salted-pressed, cooked-sundried, fish snacks, fermented products, fish oil, fish sauces, different fish recipes, etc. The demonstrations will be undertaken by an appropriate service provider under the oversight of the Marine Resources Development Department of MMR. The successful products will be introduced to fish processing and marketing enterprise groups for commercial uptake. To ensure faster adoption, the trials will be implemented in a participatory learning process. The initial products formulations and testing will be done in the institutional food laboratories to clearly understand and chart the production process and procedures. The enterprise groups will then be slowly introduced into the trials through targeted capacity building, encouraging and supporting them to prepare some of the products. This will ensure they acquire the skills and the interest early enough in this initiative and gain from further extension support by MMR. Enhanced capacity building and support in identifying niche markets will place them in a position that they can produce higher value products from small pelagic fish for the Eritrean markets, and possibly exportable to the region. The Programme has made a provision for the enterprise groups to access input financing for commercial scaling up of viable value-added fish product development technologies.

46. *Pilot Mariculture Technologies* – FReMP will pilot mariculture technologies at selected sites along the Red Sea coast, aiming to achieve the following: a) identify suitable sites and establish the feasibility of the selected species and systems; b) establish pilot programmes of which successful ones can serve as models for up-scaling; c) develop the science, technology and human resource base to support up-scaling of successful trials and establishment of extension, training and information systems. The Programme will support research on other potential mariculture technologies for increased productivity of groupers; the species has the potential for increased uptake in domestic and export markets (additional information is presented in Annex 2 (Marine Cage Culture of Groupers) of Appendix 14. MMR has recently established a Mariculture Research Centre along the coast, and this will be provided with support to spearhead the mariculture research in conjunction with the COMSAT and other relevant institutions.

47. *Coastal Ecosystem Management* – Fisheries, possibly more than any other modern food production system, depend on the health and natural productivity of the ecosystems on which they are

based. In terms of the coast, this means that FReMP will invest in protection of the marine ecosystems that are most crucial to fish – and thus to livelihoods. FReMP will support the *Integrated Coastal Area Management* approach which is being explored in Eritrea. In this context, regional exchange visits for technical learning will be organised, for staff, but also some community members. There will be an emphasis on mangrove management by groups: a mixture of planting and management through protective 'social fencing'. Sustainable use will be permitted for livestock fodder (through cut and carry) and honey enterprises stimulated. Afforestation with suitable species will also feature (possibly the halophyte *Casuarina equisitifolia* or equivalent species). There will, furthermore, be use of the invasive *Prosopis juliflora* which can be both utilised and simultaneously controlled by encouraging preferential use of this species for firewood. Investing in briquetting machines and establish local enterpises run by youth could be explored. In this situation, improved, more efficient cooking stoves will be promoted learning from the successful Catchment Landscape Management Project (CLMP).

48. ***Subcomponent 1.2: Development and Sustainable Utilization of Inland Fisheries Fisheries (USD 4.6 Million) –*** The focus of this subcomponent will be to augment the Government of Eritrea's efforts to develop inland fisheries in order to complement the marine fisheries resources towards meeting the increasing fish demand in the rural and urban areas as an alternative/complement of meat products. MMR has stocked fish in fresh water reservoirs, which are currently not being utilized by local communities to improve their nutrition and incomes. This is partialy attributed to the fact that somelocal communities do not have either the skills and equipment to harvest and utilize the fisheries in the reservoirs and/or households do not have a tradition of eating fresh water fish, and as such require support in purchase of appropriate equipment and development of skills. To respond to this need, FReMP will assist all concerned stakeholders to develop and implement management plans for the resources and a system through which local communities can sustainably use the fisheries. This will include establishing and building capacity of fishing enterprise units, mainly composed of youths, and fish processing/marketing enterprise groups run mostly by women. The groups will be facilitated to acquire the inputs for fishing, fish processing and marketing (refer to Component 2). The interventions on inland fisheries will take place in the four inland Zobas – Anseba, Debub, Gash Barka, and Maekel. The Programme will target a total of 15 water reservoirs, initially starting with 6 (Adi-Shaka, and Toker in Zoba Maakel; Bdho, Diga Harnet and Sememo in Zoba Debub),which will be reassessed and confimed using the set criteria, with the objective of developing a financially and environmentally sustainable model that can be replicated by the Government, other development partners or local communities in other water reservoirs and their catchments.

49. *Develop Reservoir and Catchment Management Plans* – FReMP will prepare an overall framework, in form of guidelines, for developing reservoir management plans. These guidelines will define the principles, process, scope and key players in preparing a management plan for each of the 15 reservoirs under the Programme, which will include management of the catchment above the reservoirs – ensuring their resilience and ecosystem integrity. The Reservoir and Catchment Management Plan will contain information on: a) current and future water resources available, including impact of climate change through increased evapotranspiration and changes in streamflow and temperature; b) current and expected water users; c) expected environmental impacts of fisheries (i.e. on water quality); and d) water management byelaws to ensure water quality and equitable water distribution. Emphasis will be on a participatory community-based process to ensure local ownership and sustainability of reservoir management initiatives. The management plans will be implemented through the existing institutional arrangements and should define the roles to be played by MMR Zoba branches, reservoir Water Users Associations (WUAs) and all other stakeholders. It may also consider if there is need to form a sub-committee specifically to handle fisheries management issues. Sustainability of this arrangement must be given due consideration. Issues to consider may include the possibility of charging of user fees (royalty) to the fishing groups to be granted the rights to fish in reservoirs. The proceeds would be used to finance public good activities, re-stocking reservoirs and some of the fisheries management costs. Some of the costs of reservoir fisheries management will be integrated in the normal MMR operations (work plans and budgets); this is one of the sustainability elements of this intervention.

50. An ecosystem approach will be adopted for inland reservoirs and their catchments to ensure sustainability of the interventions. To mitigate potential risks of siltation, which could endanger the

reservoir sustainability and its fisheries potential, catchment protection measures with sound ecosystem-based watershed management plans conferring resilience on the landscape will be implemented based on experience from the CLMP and the National Agricultural Project (NAP) under the Ministry of Agriculture (MoA). For example, there will be a mixture of hillside afforestation, grazing land enclosure with associated 'cut and carry' systems of fodder for stall-fed livestock and various systems of terracing and contour grass strip barriers to reduce soil erosion (and sediment delivered to the reservoirs). In this way, production systems will be "climate proofed". A careful pre-selection of reservoirs for inland fisheries will be done on the basis of catchments with conservation measures already in place. A first step will be to develop an inventory of the reservoirs, their catchment conservation and production status, and their human and livestock populations. Planning of activities will be done in a participatory, bottom-up manner through user groups, facilitated by the MoA at Zoba and lower administrative levels.

51. *Implement a System for Utilization of Reservoir Fisheries* – To realize the key outcomes of inland fisheries development, FReMP will support a participatory process to define the rules and regulations for utilizing reservoir fisheries. This process will also identify direct user groups who will carry out fishing and fish processing/marketing activities, following business principles. Fishing enterprise groups and fish processing/marketing enterprise groups will be formed at each reservoir, the former who will mainly be youth while the latter will be dominated by women. The community will decide on the rules and rights of accessing the fisheries resources.

52. *Enhance a System for the Production of Fish Seed (Fingerlings) and Restocking Water Reservoirs* – FReMP will support restocking of the reservoirs under the Programme, the frequency and quantities of stocking to be based on catch assessment data and information and the procedure will be expounded in the management plan. In order to produce enough fish fingerlings for restocking reservoirs, FReMP will support the establishment and operations of a hatchery, in Mai-Sirwa Aquaculture Research Centre, targeting a production capacity of 1.5 million fingerlings per year, especially of tilapia and catfish. Efforts will be made to involve the fishing groups in restocking activities as a way to sensitize them on fish conservation and ensure their ownership of the Programme initiatives.

53. *Pilot Aquaculture Technologies* – FReMP will pilot aquaculture technologies for increased productivity of fisheries resources. These will be implemented in a few reservoirs in order to produce models, lessons and knowledge that can be scaled up in other water reservoirs. The pilots will be set up when the local communities have been sufficiently sensitized and there is increased demand for freshwater fisheries to justify new investments in aquaculture. The choice of aquaculture species may be influenced by several factors. In view of water limited conditions, they should be tolerant to large temperature fluctuations, low to moderate oxygen content and be relatively fast growing with short production cycle (6 - 8 months to attain market size). Availability of fingerlings in the right quantity and quality, skills in production technology, market value and local consumer preferences are also important considerations. Tilapia, carp fish and cat fish are all suitable fish species in water-limited aquaculture condition, their culture technology is well understood and they can be cultured in ponds, tanks or in cages. FReMP will pilot two of these aquaculture production technologies. The pilots will be subject to management plans and feasibility studies, including screening for environmental and social risks and where necessary impact assessments will be carried out.

54. The Programme will pilot cage culture technologies in two reservoirs, which must be carefully selected in terms of adequate depth to support cages, suitable water quality characteristics and high production potential. Cage culture will require reservoirs dedicated entirely for irrigation and where there is no envisaged use for human or animal consumption. There will be need to monitor the water quality parameters to ensure the conditions are favourable for fish growth and take measures to mitigate accumulation of nutrients. The aquaculture activity can be integrated with vegetable farming where water already rich in nutrients, can be used to irrigate crops downstream. Secondly, FReMP will pilot aquaculture in grow-out ponds located on the side-line of two selected reservoirs. This can allow fish feeding and pond fertilization so as to enhance fisheries productivity which, otherwise, would not be acceptable to add into reservoirs used for domestic purposes. To reduce costs, ponds will be constructed in a way that they can get water from the dam by gravity, integrating them with the existing irrigation schemes. Stocking will be done during the rainy season when there is less demand for water and conditions are favourable for plankton growth. Each pilot site will have up to 5 ponds to

test technical viability of different culture options. Fingerlings will be supplied from the Mai Sirwa Research Centre. FReMP will build capacity of beneficiaries for formulation and production of low-cost fish feeds using locally available farm ingredients; this is an important initiative since feeds often constitute up to 60 percent of production costs. Successful technologies will be introduced to two community groups for scaling up. The groups will get more intensive training on practical aspects of raising fish, entrepreneurial training and group dynamics and formulation of fish feed from local materials. They will be linked to the CCU for inputs, to Mai Sirwa for fingerlings and to processing/marketing groups to sell fish. MMR Zoba branches and Mai Sirwa will provide technical backstopping to the groups as needed.

55. ***Subcomponent 1.3:*** **Market Development and Promotion of Fish Consumption (USD 2.3 Million) –** This sub-component will support activities under four intervention areas; (i) Market development (ii) establishment of an umbrella cooperative for national distribution and marketing small-pelagic fisheries and (iii) promoting consumption of fisheries products to enhance nutrition..

56. *Market development* – FReMP will support market surveys to keep in track with the market dynamics and align production activities with increasing demand. Attention will be put on development of marketing strategies for different fish products and technologies introduced by the Programme. Effort will be made to establish market linkages and outlets for each cooperative/enterprise groups in the Programme. The Programme will strengthen the national capacity to develop regulations and standards for food quality and safety with respect to fishery products and support branding and promotion of viable fishery products into the local markets. Additional support will be provided for operationalization of the food quality laboratory which is vital for Eritrean fisheries to access export markets. The Programme has made provision for Technical Assistance (TA) input for market development activities which could be sourced from local instutions such as COMSAT and/or partnerships explored with UN specialized agencies with required technical competencies such as FAO and UNIDO.

57. *Establish an Umbrella Cooperative for National Distribution and Marketing of Small-Pelagic Fisheries* – Apart from the animal feed market, it is recognized that there is, presently, no instituion specifically performing the national distribution of the small pelagic fish for human consumption. To fill this gap, the Programme will facilitate the formation of an umbrella cooperative, to be formed by processing cooperative units as members/shareholders. The umbrella cooperative will carry out the commercial distribution and marketing of dried small pelagic fisheries to inland cities/towns across the country and linked to wholesalers and/or small retailers as appropriate. The cooperative should have a business plan for its operations and FReMP will support capacity building to enhance the entrepreneurial skills. The co-operative will be allowed to develop gradually corresponding to the increased demand for its services in marketing small pelagic fishery, nonetheless it is envisaged that it should be functional fully by the third year of FReMP.

58. *Promote Consumption of Fisheries Products for Improved Nutrition* – This activity will target the traditionally non-fish eating communities, non-fishing communities, households at the dam catchment areas, women and children. Generally, communities that are far away from the sea are not familiar with fishing activities and tend to have poor fish eating habits. Value added products (such as Pickle/fermented fish products, fish powder, protein concentrates, fish oil, fish-based snacks, etc.) will be promoted for consumption at households, in hospitals for malnourished children and schools. Fish consumption will be promoted through the existing multi-sectoral approach for community-based interventions. MMR staff at Zoba and sub-Zoba levels will collaborate with the Ministry of Health (nutrition community volunteers), Ministry of Agriculture (extension workers, home economics experts and home agents), the National Union of Eritrean Women (NUEW) and National Union of Eritrean Youth and Students. In an effort to leverage resources and build synergies in addressing the underlying causes of malnutrition, this activity will explore partnership with other development partners, such as FAO, United Nations Children's Emergency Fund (UNICEF) on nutrition/health messaging, water, sanitation and hygiene (WASH) and behaviour change communication. The Government of Eritrea recognizes communication as a comprehensive action with broad stakeholder participation and multiple channel of information dissemination. Promotion activities will be implemented through three stages: a) awareness campaigns; b) development and promotion of recipes; and c) sustainable dietary intake.

59. *Awareness Campaign* will aim at sensitization, behaviour change communication to create awareness, educate and inform on the important nutritional quality of fish with emphasis on the small pelagic fish consumption. The channels for promotion will include radio/TV programmes, drama, social marketing, newsletter, magazines, songs in local languages and the gender tool on household methodologies. *Recipe Development* aims to increase dietary diversity and availability of varied nutritious products. New improved recipes will be developed by enriching locally available staples, such as the Eritrean cuisine *tsebhi* (stew), *Njera/taita* (flatbread made from teff, wheat, or sorghum), and *hilbet* (paste made from legumes; mainly lentil and faba beans). In collaboration with FAO, Ministry of Health, MoA's Home Economics Unit and Nutrition, the existing recipe book will be updated and households will be trained on new developed recipes. The recipes will be published in forms of leaflets and booklets with translation in different local languages. Food demonstration using the new recipes will be conducted by extension workers at community levels. *Sustainable Dietary Intake* aims at influencing regular availability of fish for sustainable food security. At household level, the activities on fish promotion, behaviour change communication and nutrition education will be implemented using the household methodology approach. This approach will explore gender issues to accelerate uptake of nutrition information and improve eating habits for sustainable adequate family diet. The household methodology will engage entire household members – males, females, children, adults and the elderly to ensure common understanding of the nutrition message/education and compliance for adequate dietary intake. The household methodology tool will build on the existing model for campaigning and awareness creation adopted by the Home Economics Unit of the Agriculture Extension Department of Eritrea. With support from the Home Economics Experts, the home agents and extension workers at the grassroots will reach out to the households through the early innovators. These early innovators could be male or female leaders in the communities. In addition, Nutrition Education Modules will be integrated in the training plans of the Hirgigo Fisheries Training Centre and Inland fisheries Research Centre in Mai-Serwa. These two training Centres will strengthen the capacity of extension workers and other implementers in conveying nutrition messages.

60. **Component 2: Fisheries Enterprises Support Services (USD 9.3 Million) –** This component seeks to achieve two objectives: a) promote the development and capacity building of cooperatives and other enterprise groups; and b) strengthen the input provision services to ensure that the legally constituted cooperatives and enterprise groups have access to the requisite inputs to undertake economically viable and sustainable fish-related businesses. The experience generated under the FDP will be used to guide activities under the different interventions, particularly with regard to formation of cooperatives and enterprise groups, capacity development and input financing. These objectives are to be achieved through a set of two subcomponents.

61. ***Subcomponent 2.1: Entrepreneurial Capacity Development (USD 1.7 Million) –*** The subcomponent will focus on mobilisation and facilitate the organisation of different stakeholders at different links of the fisheries production and market linkage process (production/fishing, net making and mending, engine repair, drying, processing, marketing, etc.) with the objective of making them ready to effectively access and use the input provision services by the Cooperative Credit Unit (CCU). A total of over 4,200 households are expected to benefit from capacity development who have to be a member of one of the following types of co-operatives or enterprise groups ; (i) fishing cooperatives for small pelagic fish (ii) fish processing/marketing cooperatives and enterprise groups (iii) additional cooperatives for the large fish (iv) fish retailing cooperatives (v) cooperatives for foot fishers (vi) entrepreneurs for boat/engine repair (vii) women co-operatives for net making/mending and (viii) fishing enterprise groups around the target dams. In order for the organised groups/cooperatives to be linked to/and benefit from the services of the CCU, they must be legally registered. The Programme will adopt a stepwise approach successfully employed under FDP for formation of viable and sustainable cooperatives, which is to be achieved through the following activities: a) Awareness creation about the advantages of belonging to a group/cooperative that encourages and works towards the attainment of agreed objectives; b) Facilitate the formation and registration of new groups/cooperatives; c) Capacity build the groups/cooperatives in technical aspects, entrepreneurship and group dynamics; d) Link the groups/cooperatives with a financing mechanism to access inputs; and e) Link the groups/cooperatives to a potential market for their products. The objective will be to promote viable entities owned and managed by members, with particular focus given to youth, women and foot fishers.. FReMP will provide technical assistance and training for such development. For the purpose of manageability of the different groups/cooperatives, efforts will be made to ensure that

membership is not more than 15 which, based on experience from FDP, is considered to be an optimum size for running a viable enterprise/cooperative in the fishery sector.

62. ***Subcomponent 2.2: Strengthen Input Supply Services –*** This subcomponent will focus on consolidating the revolving assets financing system, already established and operational under the FDP, for the sustainable supply of inputs needed by the small-scale stakeholders at the different links of the fisheries production and market linkages. However, the CCU will be transformed into the Cooperative Support Unit (CSU). One of the key differences between the CCU (under FDP) and the CSU (under FReMP) is the fact that the CSU, in addition to providing the asset financing services, will also provide management support services to cooperatives. One of the functions that were not undertaken by the CCU, under FDP, was the transformation into an autonomous (or semi-autonomous) entity. This is an area that FReMP will put particular emphasis on.

63. The subcomponent will also broaden the coverage of the financing system from focusing only on small-scale fishers to include other qualifying stakeholders along the fisheries supply chain. Coverage of the CSU will be broadened to be national in scope and include all activities related to the sustainable undertaking of small pelagic and inland fisheries enterprises (such as fishing, drying, processing, marketing, etc.). All groups/cooperatives supported under Subcomponent 2.1 will be linked to the CSU to access the requisite inputs to commence operations. This will necessarily require establishment of CSU branches in four inland Zobas in addition to the two coastal Zobas which already have branches. However, given the low level and pilot nature of activities for inland fisheries, the CSU branches in the four inland Zobas will have a light footprint during the first three years of the Programme and will be gradually developed as and when FReMP's inland fisheries' activities unfold to the level that will generate demand for fisheries inputs by the target beneficiaries.

64. The establishment of an autonomous CSU will be instrumental for a sustainable provision of assets revolving financing for inputs and management support to individual small-scale fishers or groups. The operational modalities and charter as well as guidelines and procedures for asset financing have been established and disseminated to fishers' cooperative members along the Eritrea Red Sea coastline. The assets financing initiation, vetting, allocation and recovery processes are done in close collaboration with the Government's decentralised systems and concerned cooperatives' management. There is a demonstrated strong interest in accessing fishing inputs, such boat engines and fishing gear accessories, motors, spare parts and ice boxes to support fishing operations. FReMP will strengthen the CSU's structure and capacity to manage and supervise its operations and, to the extent possible, streamline the collection of repayments to minimise the likelihood for defaulting. Capacity building of the CSU will, among other things, address technical and credit risks and therefore provide safeguards to the operational viability, benefits to fishers and sustainability of the interventions. An appropriate accounting and administration software will be procured for the CSU to allow for: a) appropriate administration and tracking of outstanding loans and repayments; b) monitor stocks of fishing gears and equipment; and c) produce loan portfolio reports. The FReMP PIM will include a module on the revised CSU operational modalities and charter as well as asset financing guidelines.

65. It should be noted that the CSU will only manage the asset financing system in a sustainable manner for its members and not cash credit. For all other aspects related to cash credit or micro-insurance, the Programme will link the desiring beneficiaries to alternative sources of micro-finance services, such as the Savings and Micro-Credit Programme (SMCP). That is, all individuals/cooperatives/groups needing cash loans would be facilitated/organised and linked to alternative credit-providing institutions from which they will seek to acquire cash loans.

66. Details related to the CSU in FReMP and alternative sources of micro-finance to the FReMP target group are presented in Annex 1 of Appendix 4.

67. **Component 3: Institutional Strengthening and Implementation Support (USD 8.1 Million)** – This is a cross-cutting component servicing the two technical components. The objective of the component is two-fold. First of all, it will ensure that the institutions mandated with the responsibilities of implementing and overseeing the different implementation processes of FReMP have the requisite capacity to effectively execute their respective duties. Secondly, it will facilitate and manage the

Programme in an efficient and effective manner by providing overall coordination, including planning and implementation, financial management and control, procurement support, monitoring and evaluation, knowledge management and sharing, progress reporting, and liaison with all relevant institutions. For this purpose, Programme Coordination Offices (PCOs) will be established at the national and Zoba levels for the effective coordination and implementation of the different Programme activities. Details are contained in the Organisational Framework Section.

68. ***Subcomponent 3.1: Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector (USD 3.7 million)*** – The main focus of this subcomponent will be on strengthening capacity of MMR and affiliated institutions to enable them to effectively undertake their respective responsibilities in the development of Eritrea's fisheries sector during the implementation of FReMP and beyond. The Programme will provide them with facilities, equipment, and technical skills as well as updating relevant fisheries policies and strategies to facilitate trade and commercialization of the sector. The support will target the following institutions:

a) *Marine Resources Development Department (MRDD) and the associated Zoba branches* – The focus will be on strengthening capacity for marine fisheries and aquaculture development, management and utilization. Support will be provided to MMR Zoba branches in terms of equipment and training for effective monitoring of inland fisheries resources. FReMP will build capacity of MMR extension staff in nutrition and household methodologies. Transport facilities will be provided to facilitate technical backstopping and strengthen extension services for fishing and post-harvest activities. Support will be provided for branding and promotion of commercially viable products developed under the Programme;
b) *Marine Resources Regulatory Services Department (MRRSD)* – FReMP will support the Department to improve quality control and fish handling skills. It will provide assistance for development of food safety standards where there are gaps. It will avail training and TA services to strengthen capacity for monitoring, control and surveillance (MCS) operations; it will also support MMR to operate either a Vessels Monitoring System (VMS) or Automatic Identification System (AIS);
c) *Marine Resources and Research Division (MRRD)* – the Division will be supportedwith the equipment and gears to strengthen research capacity, including for fish stock assessment and updating of MSY estimates and to establish an information system on Oceanographic and Meteorological factors. The fisheries database will be strengthened with relevant hardware and software for more effective data management. FReMP will support operationalization of the Mariculture Research Centre to spearhead mariculture activities under the Programme;
d) *Human Resource Development Division (HRDD)* – The Division's capacity will be enhanced variously to enable it to effectively develop and undertake training programmes for MMR Departments, Divisions and other stakeholders in the fisheries sector. Support will be provided to the Hirgigo Fisheries Training College (HFTC) to upgrade its current programme to certificate level, including curriculum development, giving particular attention to nutrition and small pelagic fisheries; and
e) *Cooperatives Credit Unit (CCU)* – The Programme will strengthen the CCU's capacity to enable it to adequately and appropriately respond to the diversity of input demands from the different categories of FReMP beneficiaries. Interventions will focus on strengthening mechanisms for input procurement, distribution and loan recovery. The objective will be to put in place an institution that would not only focus on the procurement and distribution of fishing inputs but also effectively provide management support services to cooperatives and the other enterprise groups on a sustainable basis.

69. ***Subcomponent 3.2: Programme Coordination and Implementation Support Services (USD 5.4 milllion)*** – The objective of this subcomponent will be to strengthen FReMP coordination, monitoring and evaluation at central and Zoba levels. Support under this subcomponent will be directed at the National Programme Coordination Office (NPCO) and Zoba Programme Coordination Offices (ZPCOs) to enable them to effectively undertake their respective coordination and implementation functions. FReMP will finance the NPCO and ZPCOs operational costs, procurement of office equipment consumables, vehicles, motorcycles and the associated equipment maintenance costs. It will provide Programme staff salaries and TA to address specific needs. Support will also be provided to NPCO and ZPCOs staff to receive training, as and when needed, to equip them with the

skills required to effectively undertake their respective responsibilities. In turn, the NPCO and ZPCOs will be charged with the overall responsibility of coordinating and monitoring the implementation of Programme activities, including: a) financial management and reporting; b) coordination of all procurement for goods, works and services; c) preparation and coordination of FReMP's Annual Work Plans and Budgets (AWPBs); and d) monitoring and evaluation of Programme activities. The NPCO and ZPCOs will conduct AWPB review meetings, annual outcome surveys, biannual implementation progress reviews and annual national stakeholders' knowledge sharing workshops. A baseline survey will be undertaken to benchmark the existing situation in FReMP's target areas prior to start up; this will include a food survey for nutrition-specific indicators. The baseline survey will include context-specific needs assessments of the concrete barriers to smallholder-driven fisheries sector development in the different target Zobas and sub-Zobas and address pressing information needs for implementation planning. Results and learning-oriented progress reporting will be based on inputs from beneficiaries and implementing partners using appropriate technologies. Monitoring results will be part of the six monthly progress reports and assessment/evaluations of the FReMP.

70. A number of TA activities and short term trainings are envisaged during the lifespan of the Programme. Areas that could require TA include: a) mariculture pilots ; b) postharvest technologies; c) fish quality assurance; d) hatchery establishment and operations - TA support for training and operationalization of the Mai Sirwa Hatchery; e) stock assessment and f) database management ystem.

D. Lessons Learned and Adherence to IFAD Policies

71. From IFAD's country portfolio of completed and on-going Programmes/Projects in Eritrea, there are many lessons learned of relevance to FReMP. A more comprehensive list is provided in Appendix 3. A summary of such lessons and their design implications are provided hereunder:

- It is important for the Programme not to commit to undertake implementation of certain activities when some of the requisite activities are dependent on steps/processes that are clearly beyond the control of the lead implementing agency. Instead, the Programme should plan to support the process once higher level approval for the requisite activities has been obtained. This is exemplified by the Integrated Coastal Area Management (ICAM). ICAM-related interventions in FDP never materialised because they required the establishment of the Integrated Coastal Area Management Authority which is yet to be established. In FReMP, such experience has been avoided. Interventions have been sequenced in such a manner that activities under each component and by the different implementing agencies reinforce each other and all processes are within the control of MMR, the lead implementing agency;
- Training in fishing techniques and other technical aspects are important, but should be accompanied with training in simple business decision making, business management and financial control. As such, the Programme has incorporated training on technical aspects, entrepreneurship and group dynamics for all cooperatives and enterprise groups to be established under the Programme as a prerequisite for accessing input financing;
- The nature, duration and timing of TA during Programme implementation need to take into account the actual Programme needs, the complexity and country context. In order to maximise both the chance of availability of TA services and benefits, the Programme needs to adequately package the TA requirements and appropriately sequence implementation of the TA. In addition, recruitment of TA provided and managed by a specialised agency, such as FAO, would maximise the chance of predictability for availability and timely provision of required services. FReMP implementation will closely liaise with FAO on all issues related to TA;
- Financing arrangements, including credit, should take proper account of technical and credit risks, administrative costs, and be backed by appropriate recovery arrangements. FReMP will strengthen the CCU's structure and capacity to manage and supervise its operations and, to the extent possible, streamline the collection of repayments. These steps will be undertaken to minimise the likelihood for defaulting by addressing technical and credit risks and therefore provide safeguards to the sustainability of the interventions. In addition, the administrative costs would form part of the 'mark-up' that borrowers would be made to pay as part of the cost of borrowing;

- Level of technology introduced to fishers must commensurate with the target group's technical and financial abilities. In FReMP, interventions that involve introduction of new technologies will necessarily require piloting of such technologies on a small small-scale followed by evaluation of its technical and economic viability before being rolled out. The target beneficiaries will be fully involved in the pilots;
- Promotion of organisations with a clear business objective is important but the decision to organize should be the sole decision and responsibility of the people and organisation, and such organizations must have a legal base. The Programme will create awareness about the advantages of belonging to an organisation that encourages and works towards the attainment of agreed objectives but will play only a facilitation role with regard to the formation and registration of the organisations; the decision to organise will entirely be made by the people;
- New Programmes tend to take a long time to effectively take off. This is attributable to a number of factors. The most commonly cited factor relates to the protracted process of recruiting the Programme staff. In addition, when the staff are on board, there is a need for the newly recruited staff to get acquainted to the IFAD processes and procedures. FDP particularly suffered from this factor since it was the first IFAD-supported investment in the country's marine sector and implementers went through a steep learning-curve and a considerable amount of time was lost. It is, therefore, recommended that, efforts be made, whenever possible, to retain the good performing staff from the preceding Programme/Project to help provide a good start for the new Programme; GoE has committed to retain the performing staff from FDP and make them available for FReMP;
- Monitoring and evaluation function has been a weak link in the process of FDP implementation. Experience has shown that the impact emanating from different Project interventions is not properly consolidated and consistently documented. FReMP will need to pay particular attention, from the very beginning, by establishing simple but effective monitoring and evaluation systems to ensure that outputs, outcomes and, eventually, impact are captured and dully reported;
- When the benefits of different Project interventions are properly demonstrated to the target beneficiaries, they tend to take such interventions to the next level. Such was the case with mangrove tree planting under FDP whereby the target communities, convinced of the associated benefits (honey production and fodder for small livestock) ended up planting 33% more hectares than FDP had targeted. The same approach will be used under FReMP when undertaking interventions related to the ecosystem management along the coastal environment; and
- In procurement, framework contracts can be very effective in minimizing the cost and effort wasted in preparation of multiple similar small procurement processes by agreeing fixed prices with a supplier for a set period of time. Framework contracts were very instrumental in improving the performance of the FDP procurement function. FReMP will consider using the framework contract approach when appropriate.
- Managing of the fishing inputs and equipment under a revolving fund facility requires unique internal control mechanisms. The fiduciary risks are that the volume of the fund could become too heavy to be managed by a relatively young CCU and accounting misstatements may occur purely due to capacity gaps. Specific provision has been made under FReMP to continue to strengthen the CCU to manage the increasing volume of transactions.

72. FReMP will be implemented in compliance with a number of IFAD's policies, including IFAD's Strategic Framework 2016-25. The goal of the IFAD Strategic Framework is to *'enable rural households and communities to gain increasingly remunerative, sustainable and resilient livelihoods that help them permanently move out of poverty and food insecurity'*. FReMP will also be implemented in compliance with IFAD Policies on Natural Resources Management and Climate Change Strategy. The climate change adaptation measures are integrated into Programme activities to address the inherent risks resulting from a changing climate and the potential multiplication of effects, such as damage to the ecosystems.

73. As an extra safeguard, IFAD has developed a complaints procedure for "Alleged Non-Compliance with its Social and Environmental Policies and Mandatory Aspects of its Social Environmental and Climate Assessment Procedures". Parties adversely or potentially adversely

affected by IFAD-funded Projects/Programmes can bring these issues to IFAD's attention using SECAPcomplaints@ifad.org. The other IFAD policies will be complied with include: a) Targeting Policy – Reaching the Poor (2010) – In order to ensure Programme benefits reach the intended beneficiaries, target groups have been defined, a targeting strategy developed and means of operationalizing that strategy integrated into Programme design and implementation modalities; and b) Gender Equality and Women's Empowerment (2012) – FReMP is fully in line with IFAD's policies on Gender Equality and Women's Empowerment. Measures are included to ensure that women and youth benefit from Programme interventions. Such measures include the provision that women will constitute at least 30% of cooperative members and other groups under the Programme, who would access the relevant capacity building and inputs for increasing production. Also, the nutrition focus in this Programme is aligned with GoE's strategy on food security and nutrition and IFAD's corporate commitment to nutrition-sensitive interventions and links to the operationalization of IFAD action plans on mainstreaming nutrition.

III. FReMP Implementation

A. Approach

74. The overall approach of the Programme is strengthening production systems and market linkages. FReMP will use communities as the entry point through engaging local institutions in participatory planning procedures to develop and implement plans for sustainable fisheries development. The Programme will be implemented through, and be fully embedded into, the GoE decentralised system. Based on the experience of implementing FDP and other IFAD-supported Programmes/Projects, the basic approaches to be adopted for the implementation of FReMP are:

- An ecosystem approach based on the catchment management concept where management plans for the communal/public good in the coastal area of Eritrea's Read Sea and inland dams/reservoirs would be developed by the users' communities. A strong commitment is made to utilize fisheries resources within maximum sustainable levels, and measures put in place for effective monitoring of fish stocks to provide data to inform management plans. This will enhance sustainability of Programme interventions and ensure ecological integrity. An inclusive gender equality and mainstreaming approach that will ensure equitable participation by women, youth and vulnerable groups, through sensitivity to timing, location, venue and language of the capacity building package will be employed; and

- To the extent possible, Public-Private Partnerships that encourage the use of private sector service providers wherever they have a comparative advantage over public sector agencies will be used.

75. With regard to the envisaged inland fisheries development, interventions will be coordinated with agricultural development to promote synergies which will enhance opportunities for poverty reduction, increased food security, and environmental conservation. In addition, all stakeholders living around the target water reservoirs and in the associated hydrological catchment areas will be part of the Management Plan formation and implementation to ensure sustainability.

76. In view of limited human and institutional capactities in the country, FReMP will adopt a sequencing of activity implementation reflecting more realistic target levels, growth rate of the programme uptake and available resources. A stepwise approach will be taken for promotion of viable and sustainable cooperatives/business entities owned and managed by members. For some activities (inland fisheries and introduction of small pelagic) a pilot approach will be considered, starting with small localised investments and gradually scaling up activities based on demonstrated positive results, lessons learnt and experience. The financing plan and disbursement per semenser will take into account these factors.

77. FReMP has a particular focus on the promotion of cooperatives and business enterprises. In order to develop viable and sustainable cooperatives and business enterprises that are owned and managed by members, a stepwise process will be followed. The process will entail the following steps: a) Awareness creation about the advantages of belonging to a group/cooperative that

encourages and works towards the attainment of agreed objectives; b) Facilitate the formation and registration of new groups/cooperatives; c) Capacity build the groups/cooperatives in technical aspects, entrepreneurship and group dynamics/management; d) Link the groups/cooperatives with a financing mechanism to access inputs; and e) Link the groups/cooperatives to a potential market for their products.

78. Some of FReMP's planned activities are of a pilot nature. For such activities, the results of the different pilots would need to be produced, evaluated for their technical and economic viability before further investments can be undertaken. With positive results, decisions will be made on the subsequent level of investments to scale up the tested and proven technologies; the scaling up process would, necessarily, make use of the lessons learnt and experience gained from the different pilots.

79. This sequencing of activities should ensure that the activities under each component and by the different implementing agencies reinforce each other and jointly leading to the achievement of the Programme's development objective in an effective and efficient manner. The sequencing will be done at the Annual Work Plan and Budget preparation stage.

80. **Partnership** – FReMP will coordinate and harmonize with Programmes/Projects financed by various development partners that support FReMP-related thematic areas. This would be aimed at taking advantage of existent synergies and avoiding duplications. The Programme will complement and build on interventions by the other development partners to ensure a harmonized contribution to the Government's strategic priorities and development targets in the sector. Potential collaboration will be explored with the following development partners: Federal Republic of Germany, AfDB, European Community, UNDP, FAO, UNIDO, and the International Labour Organisation (ILO). Where applicable, collaboration mechanisms will be firmed up and formalised in form of Memoranda of Understanding.

81. ***German Cooperation*.** Discussions held on 28 July 2016 between the German Federal Ministry for Economic Cooperation and Development (*Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung*- BMZ) and IFAD Senior Managemement have confirmed Germany interest to cofinance FReMP to the tune of about Euro 10 million. This support is in the line with the Germany "One World-No Hunger" special initiative in the context of the G7 Food Security Agenda. Areas of interest of Germany cooperation in the fisheries sector in Eritrea include sustainable small-scale fisheries and aquaculture which is he focus of FReMP.

82. ***FAO Techical Assistance.*** Opportunities for collaboration between IFAD and FAO in the context of FReMP were firmed up. Learning from the FAO/IFAD Capacity Initiative in Eritrea and comparative advantages between the two agencies in the fisheries sector, it was agreed that FAO would provide some of the Technical Assistance identified in FReMP through a Technical Cooperation Programme (TCP) to complement IFAD investments. Subsequent discussions with MMR welcomed this initiative and agreed that FAO will manage the TA activities under FReMP. An inventory of all TA will be done, consolidated and will be submitted to FAO Eritrea and used to further refine the TCP. It was also agreed that FAO will work with the MMR in defining the implementation modalities the TCP; upon completion, the TCP will be submitted for approval. FReMP revised PDR will take into account FAO's support. An indicative figure of USD 500,000 has been captured in the final PDR.

83. ***GEF financing*.** Disucssions with the GEF/LDCF Focal Person in the Eritrea Ministry of Land, Water and the Environment (MLWE) confirmed opportunities for co-financing of FReMP from the available funds from GEF 7. A detailed Project Investment Proposal (PIF), building mainly on activities already contained in the FReMP PDR has been submitted for approval. An indicative amount of USD 7.86 million and activities to be financed have been captured in the PDR.

84. **Scaling-Up –** During the design of FReMP, scaling-up was addressed from two perspectives. First of all, it was looked at from the perspective of what has been tested and proven and is ready to be replicated. In this regard, the asset financing model established under FDP is proving to be instrumental in sustaining the country's small-scale fishing sector, particularly of the large fish along the coastal areas. FReMP will use the tested and proven model to commercialise the small pelagic fish and inland fisheries supply chains. Qualifying actors at the different links of the chains will be able

to access the inputs they need to actively participate in income generating activities. Secondly, scaling-up was considered from the perspective of piloting certain practices during the implementation of FReMP with the objective of establishing both technical and economic viability. When successfully established, the information will be made available for replication by either GoE or its development partners. In this regard, the practices to be piloted include: a) sustainable production and utilisation of inland fisheries in water reservoirs; and b) mariculture technologies for increased productivity of marine species.

B. Organizational Framework

85. The management, coordination and implementation of FReMP will involve various government institutions as well as private sector entities, where applicable, that will play different roles at various levels for effective delivery of the Programme to the intended beneficiaries. The process will be governed by four main principles: a) alignment with GoE systems and procedures, especially those governing public expenditure management and procurement, and integration of Programme implementation into relevant institutions in decentralized government structure; b) greater empowerment of beneficiaries to take lead role through their grassroots institutions in Programme planning and implementation; c) cooperation with private sector service providers, where applicable; and d) stronger partnerships and harmonization with other development partners and other stakeholders in the sector. The implementation arrangements for all FReMP components will be provided in a detailed Programme Implementation Manual (PIM).

86. The Ministry of Marine Resources (MMR) will be the lead executing agency. The MMR has overall responsibility for the management and development of the fisheries resources of Eritrea within the legal framework provided by the Fisheries Proclamation (No.104/1998). The Programme delivery systems will be integrated into the decentralized government organisational and operational structures that cascade from the national level to regional levels (Zoba, Sub-Zoba and Kebabi). The Ministry has two operational Departments: the Marine Resources Development Department, and Marine Resources Regulatory Services Department. In turn, the Departments have Divisions all which will have different roles to play during the course of FReMP implementation. The operations of the ministry are decentralized into six zonal branches for each of the six Zobas.

87. *The Marine Resource Development Department (MRDD)* – MRDD has three Divisions: a) The Artisanal Fisheries Development Division, which provides fisheries extension services to small-scale fishers, including small-scale fisher cooperatives; b) The Programme Analysis and Infrastructure Development Division which provides support in construction, maintenance and supervision of fish landing facilities, undertakes programme analysis, sector planning, and programme implementation services; and c) The Inland Fisheries Development Division which provides support for fresh-water fisheries and aquaculture production.

88. *The Marine Resources Regulatory Services Department (MRRSD)* – MRRSD has three Divisions: a) The Marine and Coastal Management Division, which is responsible for research in marine resources management, data collection and management, and environmental management; b) The Fish Inspection and Quality Control Division which provides quality assurance and certification services, including the management of Quality Control Laboratory in Massawa, postharvest research and training; and c) the Fish Industry Development Division which is responsible for fleet licensing, promotion of investments in the fishery sector, and monitoring, surveillance and control.

89. All six Divisions under the two MMR Departments will be strengthened (see Subcomponent 3.1) to avail them with the skills and equipment required to adequately and effectively respond to the scope and technical demands of the Programme. MMR technical Departments and the six Divisions at the national level will provide technical backstopping to Zoba level implementation of the Programme.

90. At the national level, the institutional and implementation arrangement for FReMP will, to a large extent, build on the existing structures and mechanisms of the predecessor FDP, allowing FReMP to gain from the lessons, experiences and achievements of the FDP. MMR, the lead executing agency, will be supported by: a) the Programme Steering Committee (PSC), chaired by the Minister for MMR and composed of ministers of those ministries with direct relevancy to the

achievement of FReMP's goal and development objective. These include the Ministry of Local Government, the Ministry of Agriculture and the Ministry of Land, Water and Environment. The tasks of the PSC will include: i) provision of strategic guidance towards the achievement of Programme objectives and contribute to the higher level sector policy and strategic goals; ii) approval of the Programme's Annual Work Plans and Budgets (AWPBs); iii) provision of strategic guidance on allocation of Programme resources; and iv) facilitate inter-ministerial coordination and collaboration. The PSC will be supported by a Technical Committee (TC) responsible for reviewing and synthesizing technical documents for the PSC's final scrutiny and approval. The chairperson for the TC will be nominated by MMR Minister, and its members will include the Directors General of MMR Technical Departments and Heads of the Land and Agriculture Departments in all six Zobas; b) National Project Coordination Office (NPCO), established under FDP, will continue to provide day-to-day management and supervision of FReMP, under leadership of a National Programme Coordinator. The other members of the NPCO will include Financial Controller, Procurement Specialist, Monitoring and Evaluation (M&E) Specialist, Assistant M&E (in charge of Knowledge Management) and a Programme Assistant. Other responsibilities will include financial management and procurement of goods, works and services; consolidation of the Annual Work Plan and Budget; monitoring and evaluation; collection and dissemination of information/knowledge and facilitation of decentralized planning process. With the support of the NPCO, the MMR Departments will assume the primary responsibility of technical backstopping, ensure timely and coordinated responses to technical demands from the Zoba administrations.

91. At the Zoba level, FReMP will be managed and coordinated through the respective Zoba Administration systems. The day-to-day implementation and coordination will be the responsibility of the respective Zoba administration, under the direction of the Governors. Zoba Programme Coordination Offices (ZPCOs) will be introduced in all the six Zobas to strengthen management and coordination of FReMP, including planning and budgeting, monitoring and evaluation and supervision of Programme activities. The ZPCOs will include a Coordinator, M&E Officer, Financial Manager and Procurement Officer. These will be government staff seconded to the Programme. The specific responsibilities for the ZPCOs will include, but not limited to: a) facilitate and coordinate Zoba-level planning and budgeting process; b) consolidate Zoba AWPBs and biannual/annual progress reports; c) coordinate Zoba procurements, and oversee FReMP-related financial management, M&E and knowledge management services; d) coordinate data collection for monitoring and evaluation and supervision of Programme activities in the Zoba; e) ensure that the Programme is efficiently and effectively delivered to beneficiaries in accordance with the approved Programme AWPBs, approaches and guidelines; f) ensure that interventions are technically and economically sound and sustainable to deliver the intended results and impacts to beneficiaries; g) organise Zoba biannual/annual implementation reviews and stakeholders workshops for knowledge sharing; and h) establish collaboration and partnerships with other relevant development programmes/projects and initiatives implemented in the Zoba. The technical capacity of the relevant Zoba Administration institutions will be strengthened in terms of human resources and technical skills to ensure effective delivery of FReMP. The Zoba Fisheries Divisions (MMR Zoba Branches) will be responsible for technical leadership.

92. At the Sub-Zoba level, implementation of Programme activities will be supported by the relevant technical staff under the leadership of the Sub-Zoba Administrator. At the Kebabi level, the Programme will be implemented under the leadership of the Kebabi Administrator. The grassroots institutions, such as cooperatives/enterprise groups and various committees (watershed/catchment area management, water users' associations, resource management and planning committees) will be strengthened to play more prominent roles in facilitating and supervision of planning processes and implementation of Programme activities by beneficiaries/communities.

93. There are other institutions that are expected to play a key role during FReMP implementation. The specific activities that will be undertaken by these institutions will be agreed between MMR, the lead executing agency, and the respective institutions at the time of the AWPB preparation. These institutions include:

- *Ministry of Agriculture (MoA)* – The inland water reservoirs that FReMP will be using for inland fisheries are, primarily, serving as a source of irrigation and potable water in many of the

Zobas. Accordingly, MoA is a major stakeholder with regard to inland water reservoirs. Therefore, MoA will be instrumental in the process of selecting the reservoirs to work with under FReMP and in the process of developing and overseeing the implementing of management plans for the different water reservoirs. The MoA at Zoba level will also be coordinating catchment management activities;

- *Ministry of Land, Water and Environment (MLWE)* ─ Through its Land Department, Water Department and Environment Department, MLWE will address issues related to land use, provide advice on the legal framework for water use, provide water-related data, especially for inland fisheries, and ensure that FReMP activities are implemented in compliance with GoE's environmental rules and regulations;
- *Ministry of Local Government* (MoLG) ─ Given that Zobas will play a leading role in FReMP implementation, MoLG is a crucial partner in the successful implementation of the Programme. MoLG will ensure that the GoE decentralized structure provides adequate support for implementation of FReMP in all the six Zoba administrations, and their respective sub-Zobas and Kebabi. This will include integration of the Programme into the decentralized systems for planning, implementation, monitoring and evaluation and reporting and ensure adequate staffing levels;
- *Cooperative Credit Unit (CCU)* ─ The CCU will provide sustainable asset financing services to different categories of Programme beneficiaries, through their cooperatives and enterprise groups. This service, when required, will be on a credit basis through the revolving fund established under FDP to deliver inputs through asset financing mechanism. The CCU will ensure timely procurement and provision of the demanded inputs to the target beneficiaries (see Subcomponent 2.2);
- *National Fisheries Corporation (NFC)* – NFC is a government-owned parastatal that undertakes production, processing and marketing of fish through its subsidiaries (the Eritrean Marine Products Company (EMPC), Erifish, and the Assab Processing Plant). NFC is a major player in the fish supply chain since it is the sole buyer of all fish (except the small pelagic) landed at the designated landings sites. The Programme will work with NFC on the market-related aspects;
- *Hirgigo Fisheries Training Centre (HFTC)* – HFTC was established in 1992 for the purpose of providing skills development for the traditional and emerging fishers, including women, youths and demobilized soldiers[27], and upgrading management capacities of MMR staff and officers of the private sector companies. Training courses include, *inter-alia*, fishing techniques, safety at sea, navigation, boat repairs and maintenance, cooperative development, extension, postharvest management, fish marketing, net making and mending. The Programme will use HFTC's services variously in building the capacities of some of the target groups;
- *College of Marine Science and Technology (COMSAT)* – COMSAT was established in June 2005 and is under the auspices of the MMR and the Ministry of Education. COMSAT's objectives are: a) to produce graduates that will participate in the exploitation, management and conservation of living marine and coastal resources; b) to train seafarers that can serve in the maritime industry as engineers and train technical personnel that can install, maintain and repair engines and cooling equipment; and c) to generate and disseminate knowledge on the marine and maritime resources of the Eritrean coast through research and publications. FReMP will make use of COMSAT's expertise, as a service provider, in those areas of its competence;
- *Non-Government Organisations (NGO)* – There are two local NGOs with national outreach that FReMP will collaborate with during the course of Programme implementation. These include the National Union of Eritrean Women (NUEW) and the Union of Eritrean Youth and Students (NUEYS). Both NGOs have well established structures at the grassroots and may be called upon, as service providers, to facilitate the undertaking of selected activities. Such collaboration would be governed by a Memorandum of Understanding;
- The role of private retailers beyond NFC and its subsidiaries is recognized for onward sale to consumers. FReMP will support the involvement of such private operators in the market linkage.

[27] Demobilized soldiers include the youth who have completed their military service and have the ability in engaging in livelihood in the fisheries sector, including aquaculture and mariculture.

C. Planning, M&E, Learning and Knowledge Management

94. FReMP's approach to planning, supervision, monitoring and evaluation (M&E) and knowledge management system will build on the strengths and weaknesses of FDP and the other IFAD-supported Programmes in Eritrea. It will use and improve on tools and templates already developed for data collection, tracking Programme results (outputs and outcomes), physical progress reporting and dissemination of knowledge/information. It will feed into MMR's management information system and will be compatible with corresponding IFAD policies and tools, such as the Results and Impact Management System (RIMS).

95. **Planning** – The Annual Work Plan and Budget (AWPB) will be the key instrument for implementation and operational control. FReMP's annual planning and implementation cycle will be aligned with GoE's planning cycle and will comply with IFAD's requirements. GoE's fiscal year runs from January to December and the AWPB preparation process will ensure that a draft is submitted to IFAD at least 60 days before the commencement of the following Programme Year. AWPBs will be prepared for each level of Programme participants, starting with the primary stakeholders at the community level. These will identify the activities according to their needs and priorities through a participatory planning process. Thus, the Programme will adopt a bottom-up community-driven planning process, in alignment with the GoE's decentralised participatory planning system tailored to local needs and community priorities. Each Kebabi administration will be responsible for leading the annual planning process with the beneficiary communities. The community plans will be consolidated into Kebabi annual plans which will then be consolidated into sub-Zoba plans, and finally into Zoba plans by the ZPCOs. The NPCO will receive, review, harmonise and consolidate the AWPBs from the six Zobas and all other cost centres in collaboration with the MMR Departments. The NPCO will submit the consolidated AWPBs to the Programme's Technical Committee for review and endorsement before submitting the same to the PSC for approval. The NPCO will incorporate the PSC's comments and submit the revised AWPBs to IFAD for review and expression of 'No Objection'. During a given Programme Year, the approved AWPB can be revised upon request by the Government and approval by IFAD. In order to facilitate the proper preparation of the AWPB, training will be provided as part of the Programme start-up activities. A uniform format for AWPB will be used to ensure standardization and consolidation of the AWPB.

96. **Monitoring and Evaluation** – M&E will be embedded in the Institutional Strengthening and Implementation Support component, coordinated by the NPCO; this will be fed into by all implementers at national and Zoba levels and supported by additional professional staff who will work closely with subject-matter specialists to strengthen learning and knowledge management. The M&E system will feed into MMR management information system and IFAD's Results and Impact Management System (RIMS). The objectives of the monitoring and evaluation system set up under the Programme are three-fold: a) to provide information on Programme implementation progress towards the achievement of targeted results for Programme management and decision-making at different levels; b) for accountability vis-à-vis funds disbursed; and c) for learning purposes vis-à-vis options for replication, up-scaling and risk management. The M&E system will be participatory, gender sensitive and results-oriented while enabling the integration of physical and financial progress tracking and reporting. In addition, the system will enable the monitoring of environmental, social and climate risk mitigation measures.

97. The M&E Programme support will focus on strengthening capacity for tracking FReMP results (outputs and outcomes) through the following activities: a) M&E start-up workshops at National and Zoba levels to familiarize Programme implementing entities with the Programme Results Framework, their responsibilities in data collection and measurement of outputs and outcomes; b) the Programme will finance at least two outcome surveys, particularly during the Mid-Team Review (MTR) and End of Programme; c) a baseline survey that will be undertaken prior to Programme start up or during the first year of the Programme to benchmark the existing situation in FReMP's target areas against which the outcomes and impacts of the Programme will be assessed. The baseline will also include a food survey for nutrition-specific indicators; and d) the Programme will finance annual M&E workshops at the national and Zoba levels for M&E Officers and the focal persons of implementing agencies to assess achievements of Programme results, based on the indicator targets.

98. To ensure an effective flow of information, the NPCO M&E Specialist will develop simple and user-friendly tools for data collection, data entry, data processing and analysis. Standard forms and formats will be developed and made available to ensure consistency in the way data is recorded across all Programme areas. Specialised studies to evaluate the extent to which the Programme is making progress towards the achievement of set targets will be contracted out. Quantitative impact assessment will be carried out before the MTR. The MTR will evaluate whether the Programme is on course to achieve the Programme objectives. Any prevailing constraints will be identified and recommend such re-orientation as may be required to address such constraints and help get the Programme back on course to achieve the set targets. The recommendations will take into consideration the likelihood of achieving the objectives during the remaining time period. At completion, a Beneficiary Impact Assessment (BIA) will be undertaken and this will be used to prepare a Programme Completion Report (PCR) that will provide an overview of the accomplishments of FReMP.

99. *Implementation Progress Reports* – The implementing agencies will submit quarterly, six-monthly and annual progress reports to the NPCO through their respective ZPCOs, using standardised formats. The NPCO M&E team will produce consolidated six-monthly and annual progress reports and forward them to IFAD after approval by the PSC, not later than 60 days after the end of the reporting period. The progress reports will include: a) a summary of implementation progress of the AWPB with achievements compared to annual targets; b) a summary of overall implementation progress with cumulative achievements compared to Appraisal Report targets together with a summary of related impact studies, where applicable; c) detailed implementation progress by component; d) a summary of expenditures relative to Programme disbursement targets; e) a summary of successful approaches and lessons learned; f) implementation constraints; and h) the way forward (this is the conclusion of the report based on the financial and physical progress, the analysis of Programme performance, and progress towards achieving Programme outcomes and impact that have been discussed in previous sections of the report).

100. **Learning and Knowledge Management** – Learning and Knowledge Management (L&KM) will play an important role in FReMP's planning, supervision, monitoring and evaluation system, helping to inform activities, replication and scaling up. It will serve as a foundation for replication of successes, provide the analytical basis to resolve challenges, and help to adapt activities to changing social and economic circumstances in the target areas. FReMP's M&E team at the national level, in liaison with their Zoba counterparts, will be responsible for developing a L&KM system that will establish mechanisms and structured approaches for capturing lessons learnt, new knowledge and opportunities for enhancing interventions and activities throughout the Programme life cycle. The system will ensure that knowledge generated within the Programme is put to good use and that relevant knowledge available from elsewhere is accessible. The system will involve: a) a series of structured review and reflection meetings at different levels for reflection and learning; b) capturing, documenting and disseminating the lessons and innovations, using different media of communication; and c) building capacity for effective L&KM through training, exposure visits and technical and material supports. M&E functions will integrate L&KM within its system. Specific attention will be given to collecting information for knowledge products to build the evidence-base on best performing cooperatives/enterprise groups, climate change adaptation, mitigation and gender and youth empowerment.

D. Financial Management, Procurement and Governance

101. IFAD requires a Financial Management Assessment (FMA) as part of Project Programme designs. Accordingly, a FMA has been undertaken in accordance with the Financial Management Division (FMD) guidelines. The assessment was based on the operations of the NPCO, MMR in Asmara and prior knowledge of the operations of the Zobas under IFAD supported National Agriculture Programme (NAP) under the Ministry of Agriculture.

102. The proposed FReMP financial management arrangements are based on the key strengths and the suggested mitigations for the identified weaknesses. The summary of strengths and weaknesses of the proposed FM arrangements are tabulated below.

Strengths	Weaknesses
• NPCO which will be the accounting hub has gained experience under the Fishery Development Programme (FDP) in the implementation of IFAD funded projects. This experience will be very useful for a quick start-up of FReMP. • In addition, the accounting software in use (Laccie) was designed specifically for donor funded projects and is able to generate the required financial reports. • Where there are gaps, FReMP has made provisions for training of the staff. • The relatively very high level of financial discipline among staff at all levels in Eritrea provides the comfort that budgetary diversion and misappropriation of funds are very unlikely. • At the Zoba and lower levels, there are well developed manual accounting forms and books with clear instructions on their usage (e.g. vote books) on which FReMP can rely without having to introduce parallel approaches.	• A key weakness is the relatively high rate of staff turnover at Zoba levels. • Very low motivation levels given the low wage rates. • Generally low levels of financial management capacity. • The internal audit department of MMR does not provide services to FDP. • CCU is still weak to be able to manage the size of the fishing inputs planned and the related loans to fishers. • Laccie accounting software may not meet all the requirements of smart SOEs, especially the linkage of SOEs to the budget/activity codes.

103. The following are the capacity constraints that need to be addressed, and the proposed mitigations to improve assurance on use of funds:

- High staff turnover and in some cases no staff at all – The proposal here is to keep the FM requirement as simplified as possible. Given the high staff turnover and capacity levels at Zoba level, the Laccie software should be installed only at the NPCO. Experience from Programmes, such as NAP and the Post-Crisis Rural Recovery Development Programme (PCRRDP) shows that there is no much benefit of imposing such software to the ZPCOs. Whenever there is a change in staff, the training has to be repeated and this can happen very frequently. If the Zobas are allowed to use simple forms and books that they are already familiar with, or can quickly get familiar with, then the effect of staff turnover will be minimised as new entrants can quickly take over. Simple reconciled manual cash books will be sufficient for the ZPCOs to retire activity tagged advances received from the NPCO. Once advances are retired with sufficient paper-based and field-based evidence, these data will be processed at the NPCO in the Laccie accounting system.
- CCU is taking on a complex task of managing significant fishing inputs. However, the plan is to boost its capacity (skills and equipment), including the purchase and installation of the Loan Performance Software. In addition, the IFAD implementation support will pay particular attention, especially during the early stages of FReMP implementation.
- Strengthen or support the MMR internal audit to be able to gain confidence to include donor funded Projects/Programmes in their rolling internal audit plans. The internal auditors will be included in the Financial Management trainings to also better appreciate the Project/Programme accounting and disbursement processes.

104. **Overall Financial Management Risk Rating** – Eritrea's inherent risk is high as measured by Transparency International's Corruption Perceptions Index (CPI). The country's annual CPI in 2015 puts the country at 154th position (out of 168 scored countries) and the TI score is 18, compared to 20 in 2013 which puts the inherent risk to *High*. However, at Programme level, taking into account other control areas, the overall FReMP fiduciary risk assessment at design is assessed as *Medium.* FReMP design arrangements have taken into account this fiduciary risk and proposed appropriate mitigations, at Programme level, in order to reduce the risk. The main mitigation measures that have been proposed are: a) concerning staffing, any secondment/recruitment and changes will need IFAD's No Objection to ensure the right calibre of staff are in post; b) a proper chart of accounts to be used in

Laccie (the computerised accounting system) and in the manual platforms at Zoba level; c) training in budgeting (proper sequencing of activities) to minimise cases of time wastage, as was the case under FDP when big procurements had to be cancelled even after tendering; d) capacity building of the CCU to be able to manage the large volumes of inputs and loans; e) specific FReMP bank accounts to avoid any forms of funds comingling; f) strengthening of the internal audit department by including them in FM-related training to boost their capacity and confidence to audit donor funded Projects/Programmes.

105. **Financial Management Conditions or Covenants** will include: a) the PIM, including the financial management manual, should be submitted within 6 months after the financing agreement gets in force; b) the Laccie accounting system should be coded with a FReMP specific chart of accounts acceptable to the Fund; c) some modifications in the Laccie accounting system will be needed to be able to generate the newly introduced smart SOEs. The conditions for withdrawal will include: a) the opening of the designated account in the Central Bank of Eritrea; b) the first annual work plan and budget; and c) confirmation that the NPCO is still or has been reconstituted. There is no proposed exceptions to General Conditions.

106. *Organisation and Staffing* – Under MMR, the lead implementing agency, FReMP will have a well-staffed and resourced NPCO. In response to the assessed fiduciary risk, especially in dealing with Zobas and managing the inputs through the CCU, there will be a dedicated full time Financial Controller at the NPCO and a full time Procurement Specialist; this will allow for adequate segregation of duties at that level. Similarly at each Zoba, there will be a dedicated full time FReMP Finance Manager and a full time and dedicated Procurement Officer. The CCU will receive further strengthening in addition to the support already provided under FDP. This is considered adequate staffing to manage the FReMP funding satisfactorily.

107. *Budgeting* – Budgets will be developed through a bottom-up approach with each ZPCO coming up with its part of the AWPB (see Section III C of this document). These will be consolidated by the NPCO together with those of all the other cost centres to develop a Programme-wide AWPB.

108. *Funds Flow/Disbursement Arrangements* – The Programme is designed to have multiple funding sources: IFAD grant and other external funds (Federal Republic of Germany, FAO, GEF), GoE, and Beneficiaries. Financing modalities for IFAD cofinancing funds will be defined in respective subsidiary agreements with each of the cofinanciers. For IFAD and Germany financing, the co-financing mechanism will be on a *pari passu* principles. IFAD managed disbursements (IFAD grant and Germany contribution) will go through national systems. For IFAD, GEF and Germany grants, separate designated bank accounts in USD will be opened in the Central Bank of Eritrea and managed separately for tracebility and accountability purposes. Corresponding operating account for each financier managed by the NPCO (with the Minister of MMR and the Head of Finance and Administration being the key principal signatories) will be opened also in the Central Bank of Eritrea in Eritrean Nakfa. Given the fact that GEF and FAO financed activities are of a special nature, the co-financing will be parallel and GEF will finance identified natural resources related activities whereas FAO will finance and manage the TA packages identified under FReMP. The detailed cost tables show the exact activity level attribution to the various financiers. This will in turn always be controlled through the AWPB for each respective year There will also be a counterpart funds bank account managed by the NPCO. The funds flow chart is presented in Appendix 7.

109. The Zobas will have specific FReMP sub-accounts in commercial banks to receive activity tagged advances in line with the Approved Work Plan and Budget. The CCU will need to open a sub-account to serve those cases were there may be cash elements in the loans/revolving funds it will be managing. Transactions at sub-Zoba level will be managed through working imprest to implementers. The GoE systems are strong in terms of following up unretired working imprest.

110. *Internal Controls* – GoE's has strong internal control tools and high level of financial discipline is exhibited by staff, both financial and non-financial. In addition, the following internal controls are proposed: a) from the FDP experiences, FReMP will adapt itself to tools at Zoba level that the finance teams are already familiar with and the accounting consolidation hub will be at NPCO; b) at the Zoba level, the Governors and heads of Finance and Administration units will be key principal signatories;

c) budget control at Zoba level will be through use of vote books and at NPCO, the Laccie accounting system will ably manage this.

111. Managing of the fishing inputs and equipment under a revolving fund facility requires unique internal control mechanisms. The fiduciary risks are that the volume of the fund could become too heavy to be managed by a relatively young CCU and accounting misstatements may occur purely due to capacity gaps. Specific provision has been made under FReMP to continue to strengthen the CCU to manage the increasing volume of transactions.

112. *FREMP accounting systems, policies and procedures* – Laccie, the accounting package that has successfully been used under FDP and some other IFAD Projects in Eritrea, will be used under FReMP. However, the CCU will need more specialised loan portfolio management software. The Laccie software will be installed only at the NPCO; due to capacity gaps at the Zobas there is no benefit of imposing such software to ZPCOs. Simple reconciled manual cash books will be sufficient for the ZPCOs to retire activity tagged advances received from the NPCO. Once advances are retired with sufficient paper-based and field based evidence, these data will be processed at the NPCO in the Laccie accounting system.

113. *Reporting and Monitoring* – This will be in accordance with International Public Sector Accounting Standards (IPSAS) cash basis and will be facilitated by the Laccie accounting system. The NPCO will be the financial reporting hub. IFAD will, in addition to the annual audited financial statements, require interim financial reports on a six monthly interval as per IFAD's interim financial reporting guidelines.

114. *Audits* – IFAD grant funds will be disbursed through Government; the GoE audit processes will be used. As has been the case under FDP, the Government Auditor General will have discretion to do the audit or to appoint an independent private audit firm acceptable to IFAD. Either way, the audit terms of reference will require the Fund's No Objection on an annual basis. MMR internal auditors will include FReMP in their annual rolling internal audit plans and issue a formal report at least twice a year.

115. **Procurement –** As far as procurement is concerned, the IFAD General Conditions place the emphasis on using the Borrower/Recipient's procurement regulations, provided they are deemed to be consistent with IFAD's guidelines. To this end, the IFAD procurement guidelines require a procurement assessment to be done as part of Programme/Project designs.

116. *Country Procurement Systems Assessment* – The procurement framework in Eritrea is based on a policy document issued by the Ministry of Finance. There are checks and balances within the system which, if utilised, ensure that public procurement is undertaken transparently and competitively.

117. As per IFAD procurement guidelines, irrespective of the results of the assessment, all procurements under International Competitive Bidding (over the equivalent of USD 200,000) will follow the World Bank procedures and templates. Otherwise, the procurement policy document issued by the Ministry of Finance will apply. However, where there is inconsistence with IFAD guidelines, the latter will prevail.

118. *Project Specific Assessment* – In addition to the overarching country procurement assessment during the Programme/Project design stage, IFAD is required to undertake a more comprehensive assessment of the degree of practical implementation of the regulatory framework and the procurement capacity of the agency designated to undertake the Programme/Project procurement. The overall assessment is partially satisfactory and some of the areas need improvement under FReMP. Such areas include: a) procurement planning will need to be improved to avoid the front loading problem that FDP has continuously faced; and b) given the time lags experienced during FDP which, in turn, affected disbursement, FReMP design has made proposals on how to improve procurement efficiency (see Appendix 8). These are included in the summary of FReMP Procurement arrangements presented hereunder:

- *Staffing* – There will be a FReMP procurement unit resourced with a full time Procurement Specialist at NPCO. Each ZPCO will also have a Procurement Officer;
- *Permanent Tender Committees* – For items that are common across more than one Zoba or generally requiring national and international bidding, these will be procured nationally with contract award decisions taken by the MMR permanent tender committee;
- *Ad hoc Evaluation Committees* – Each competitive procurement package will have an *ad hoc* evaluation committee comprising of members skilled in the subject matter at hand. Evaluation committee members should not be restricted to only NPCO/ZPCO members, to ensure sufficient skill mix. Independent external members may also be used;
- *Procurement Methods* – FReMP will use a mixture of standard procurement packages (goods/services) and unique aspects. The starting thresholds to determine which procurement to apply are given in Appendix 8. IFAD's 'No Objections' will be required for all items over USD 50,000 for services and over USD 100,000 for goods and works. These thresholds will be reviewed from time to time, depending on the fiduciary risk assessment.

119. **Transparency, Governance and Anti-Corruption** – The Government will maintain a governance and anti-corruption framework throughout the Programme implementation period to mitigate the risk of fraud and/or corruption and promote effective utilisation of the Programme funds. Specific measures to mitigate identified fiduciary risks include: a) Laccie accounting system at the NPCO to substantially reduce the scope of human error; b) checks and balances in contracting and administration (discussed in Appendix 8); c) inclusion of FReMP in internal audit plans at all cost centres; d) activity tagged transfers to Zobas as opposed to general cash releases; e) reduced Statement of Expenditure (SOE) ceiling given the inherent risk (suggested to remain as USD 50,000 as is the case for FDP and NAP); f) provision for adequate staffing arrangements; and g) provision for continued capacity building of the CCU to handle the rapidly expanding revolving fund.

E. Supervision

120. Supervision and implementation support of FReMP will be jointly undertaken by IFAD and GoE. The frequency and composition of supervision and implementation support missions will be determined in light of actual requirements and in accordance with IFAD and the Government. Preferably, the Supervision and implementation support Missions will be fielded every six months. Supervision and implementation support will be based on IFAD's operational modalities and practices. Supervision will not be conducted as a general inspection or evaluation but, rather, as an opportunity to assess achievements and lessons learned and to jointly reflect on ways to improve implementation and increase the likelihood of achieving the Programme's development objective. IFAD will also provide implementation support either during the Supervision Missions or as and when needed. Implementation support will focus on planning, procurement, financial management, M&E, and the provision of Technical Assistance as may be required by the implementing institutions. The most important skills and experiences that should be represented in the supervision Missions include: a) Fisheries Specialist (with knowledge on both aquaculture and mariculture); b) Financial Management and Procurement Specialist; c) Monitoring and Evaluation Specialist; d) Cooperative Development Specialist; and e) Planner. Key features likely to require attention by the Missions will include: a) setting up of a functional M&E and L&KM system; b) procedures and systems causing implementation and reporting delays; c) the procurement function; d) formation of viable cooperatives and enterprise groups; and e) effective functioning of the revolving fund to ensure sustainable availability of the requite fishing inputs for current and future generations of fishersfishers. During the early years of Programme implementation, attention should be given to ensuring active participation of the target beneficiaries in all stages of cooperative/enterprise group development. Care must be taken to ensure that the Programme does not coerce people into cooperatives/enterprise groups. Instead, the Programme should play a facilitative role, leaving the key decision to organise to be made by the beneficiaries themselves.

F. Risk Identification and Mitigation

121. There are some potential risks that could have a negative impact on FReMP and its development objective. The Programme's Result/Logical Framework specifies some assumptions

based on which FReMP is designed. These assumptions, implicitly, signal the Programme's main risks. If a given assumption does not hold, it would negatively affect the stand on which Programme design hinges and could undermine the degree of success of the different interventions. This section describes the magnitude of the risks and discusses mitigation measures included in the Programme design. The risks are explicitly recognised, as risk monitoring forms a part of the Programme's overall monitoring and evaluation approach. By monitoring risks, the Programme can intensify its mitigation measures, or review its approaches for better success. Selected risks and the associated mitigations measures are presented hereunder:

- High staff turnover may erode institutional memory and capacity and undermine effective continuation of Programme implementation and achievement of objectives. To mitigate this risk, the Programme has included regular training of new staff in the Programme implementation entities to equip them with relevant technical skills;
- Limited institutional capacity within the decentralized administrative structures and weak M&E systems imply that there is a likelihood of failure to adequately respond to the envisaged results management framework of the Programme. To mitigate this risk, the Programme has made an allowance for institutional capacity building and, also, availed ample resources for Programme Management, including M&E-related activities;
- Experience has shown that, in general, new Programmes/Projects tend to undergo very slow start-ups and slow disbursements during the early years of implementation. This was, in fact, the situation with FDP. Substantial delays at start-up postpone Programme/Project benefits and generally result in a higher overall cost (as salaries continue to be paid, even if work does not progress); this undermines the investment's economic return. The main reasons for the slow start-ups include delays in staffing, procurement-related constraints, etc. In order to avoid similar delays, the Government and IFAD have decided to retain the experienced FDP staff to not only facilitate the design of FReMP, but also to ensure the lessons, experiences and achievements of FDP are adequately taken into account so that FReMP has a smooth start-up.
- By its very nature, the effective implementation of FReMP would involve different ministries in general and a number of other different government institutions in particular. Inadequate coordination among key ministries and/or the other government institutions could, potentially, lead to reduced outputs and outcomes in addition to conflicts at the local level. In order to mitigate that risk, FReMP has allowed for dedicated Programme Coordination Offices (PCOs) for specifically coordinating all Programme work at the national (NPCO) and Zoba (ZPCOs) levels. The PCOs would need to specify responsibilities and roles for all parties to be involved in FReMP implementation and monitor achievements accordingly;
- There is a risk that uncontrolled expansion of fishing activities could lead to over exploitation of fish resources over and above the MSY for both marine and inland fisheries. The mitigation measures include: a) setting conservative target catch levels below historical MSY estimates (19,000 tonnes per year for small pelagics), b) supporting MMR's monitoring, control and surveillance capacity, c) updating MSY estimates and adjust targets where needed, and d) invest in restoration and protection of the ecosystem. For inland fisheries, the Programme will facilitate the establishment of fishing cooperatives/groups with agreed codes of fishing and environmental practice. The Programme will also support a hatchery to restock water reservoirs as necessary. In addition, the stakeholders (MMR extension agents and fishing cooperatives) will receive training in fishing practices, including stocking and sustainable harvesting;
- There is a possibility that the Programme could lead to increased production of the different fish and fish products which, coupled with weak marketing infrastructure, may limit the returns from the different fish-related enterprises. This could have an undesirable effect of demoralising the target groups, affecting the different interventions. To mitigate these risks, linkages to markets are part of the Programme. First of all, the NFC buys all the large marine fish that are landed at all designated landing sites; the price at which the fish are bought is set by a committee comprising representatives from the NFC, MMR and fishers' cooperatives. For the small pelagic fish, the Programme has allowed for the establishment, capacity building and equipping of a marketing cooperative to alleviate the potential marketing-related constraints. For the inland fisheries, the Programme has allowed for the establishment, capacity building and equipping of fishing enterprise groups around the target dams;

- It is possible that limited access to appropriate inputs (either due to lack of the financing needed to access the inputs or due to the absence of the physical inputs themselves) could limit the extent to which the target group could make investments to optimise benefits from FReMP interventions. To mitigate this risk, the Programme is availing resources to the CCU to ensure availability of inputs on credit (if required). The Programme will also strengthen the CCU's structure and capacity to manage and supervise its operations and, to the extent possible, streamline the collection of repayments to minimise the likelihood for defaulting by addressing technical and credit risks and therefore provide safeguards to the sustainability of such an intervention;
- For inland fisheries, there is the possibility of the water reservoirs drying out during the dry season, affecting fishing activities and the livelihoods of the fishing cooperatives and enterprise groups that would be generating incomes from the inland fisheries. An associated risk is sedimentation caused by erosion during flooding and uncontrolled cattle watering. To address this risk, the Programme would undertake the following measures: a) a prerequisite for selection of water reservoirs will be those with either catchment conservation measures already in place or underway (through partnerships with MoA/ catchment management Programmes/Projects stimulated by FReMP), b) underpinning catchments with sound ecosystem-based watershed management plans conferring resilience on the landscape, based on experience from CLMP, NAP and other partner projects; c) choice of conservation measures that yield conservation and production benefits simultaneously (e.g. hillside afforestation/enclosed degraded pasture land combined with cut-and-carry feeding systems for stall-fed livestock/ terraces for farming/ small ponds for micro-irrigation of vegetable and fruits); d) establishment of cattle watering points by each reservoir and potentially fencing off the reservoirs from livestock; and e) involving the Zoba/sub-Zoba/administrations in planning and oversight;
- Underestimation of investment costs for some of the planned interventions has the potential to lead to: a) substandard undertakings for those interventions; b) undertaking of less investments than originally planned; c) a considerable delay in activity implementation as Programme Management seeks to receive authorisation from decision makers to increase the costs; etc. Either way, the Programme would fail to achieve its set targets without a cost overrun. To mitigate this risk, the FReMP costs were based on considerable consultations, including FDP's experience, in setting the unit costs. In addition, the Programme has been designed with inherent flexibility that would allow reallocation of resources across components and/or categories of expenditure, if needed, to ensure that the development objective is achieved;
- There is a potential risk from the environmental damage to/from mariculture and inland aquaculture pilots. However this is regarded to be low risk considering the limited scale of the pilots. This will be mitigated by several interventions that include: a) carrying out environmental and social impact screening and, when required, assessments in collaboration with the Department of Environment, b) establishment of groups of fish-farmers (both at the coast and inland) and training them on specific codes of practice; c) training in all aspects of mariculture/aquaculture including stocking, feeding, harvesting and processing; d) maintaining a clean and protected environment around cages/ponds; and e) fencing/planting of protective species and observing codes of conduct with respect to cleanliness; and
- Considering firm commitments of cofincing from the Federal Republic of Germany, GEF and FAO, there is a low risk that envisaged Programme co-financing does not materialise as expected. The available IFAD financing is sufficient to sustain envisaged activities upto the programme midterm review period and beyond. The mitigation strategies for filling the resultant financing gap over the seven-year Programme implementation period include: a) use the next PBA to Eritrea (cycle 2019-2021); and b) revisit the design assumptions at MTR.

122. **Environmental and Social Safeguard Mechanisms** – The classification of FReMP was reviewed under IFAD's Social, Environmental and Climate Assessment Procedures (SECAP). The risk of over-exploitation of marine fish resources, notably small pelagic fish, deserves special attention of the Programme. The end-of-Programme target annual harvest for small pelagic fish (19,000 tonnes) is below the lower bound of historical MSY estimates for this category (24,000 – 50,000 tonnes). It should, however, be noted that the last actual survey was conducted in 1998 with periodic adjustments to the current estimates. Environmental change, human activities, climate change

(seawater temperature rise) and natural migration of fish have likely influenced fish stocks in the intervening 20 years. Yet, a review of literature provides no solid evidence of downward or upward trends in fish stocks in the Eritrean Red Sea since the last estimate of MSY.

123. All in all, it is assessed that FReMP has set "safe" target levels and that all necessary mitigation measures to manage the risk of over-exploitation have been adequately integrated into the Programme. These mitigation measures are part of the precautionary approach to fisheries management. The mitigation measures include: a) setting conservative target catch levels below historical MSY estimates (19,000 tonnes per year for small pelagic fish); b) supporting MMR's monitoring, control and surveillance capacity; c) updating MSY estimates and adjust targets where needed; and d) invest in restoration and protection of the ecosystem.

124. All other potential negative impacts caused by the Programme, as listed in Appendix 12, are limited, site-specific and mitigation measures are readily identified. In conclusion, the overall Programme is categorized as **Category B**. GoE's environmental and social screening and assessment procedures will be carried out by MMR out for specific activities (inland fisheries, construction activities), in close collaboration with the Department of Environment.

125. **Climate risks –** The Programme's sensitivity to climate change impacts is assessed as **moderate**. Similar to the environmental and social categorization, the largest risk emanates from the unknown impact of increasing sea temperatures on marine fish resources. The Programme, however, through its monitoring activities, will be able to adjust to changes in fish stocks. At this design stage, there is no data available to carry out an in-depth climate risk assessment. Yet, data generated by the Programme could be used to carry out an analysis of climate change impact in the future. Climate risks to other Programme interventions are minimal and can be readily addressed through the proposed mitigation measures.

IV. Programme Costs, Financing, Benefits and Sustainability

A. Programme Costs

126. The total combined FReMP investment and incremental recurrent costs, including physical and price contingencies, are estimated at US$ 32.12 million (ERN 539 million). Table 1 below presents a breakdown of the costs by FReMP components and subcomponents. The detailed cost tables and additional summary tables are presented in Appendix 9. The investment in Component 1: Develop Sustainable Fisheries Systems, in base costs, totals US$ 11.4 million (40% of total base costs) while Component 2: Fisheries Enterprises Support Services, accounts for US$ 9.3 million (32% of total base costs). Component 3: Institutional Strengthening and Implementation Support, accounts for US $ 8.1 million (28% of total base costs).

Table 1: Programme Cost by Component

Eritrea
Fisheries Resources Management Programme (FReMP)

Components Project Cost Summary	(ERN '000)			(US$ '000)			% Foreign	% Total Base
	Local	Foreign	Total	Local	Foreign	Total	Exchange	Costs
A. Develop Sustainable Fisheries Systems								
1. Develop Marine Fisheries Production and Post-Harvest Systems	72,331	12,071	84,402	4,745	783	5,528	14	19
2. Development and Sustainable Utilization of Inland Fisheries	46,292	23,169	69,460	3,074	1,532	4,606	33	16
3. Market development and Promotion of Fish consumption	9,491	10,623	20,114	615	688	1,303	53	5
Subtotal	128,114	45,862	173,976	8,434	3,004	11,437	26	40
B. Fisheries Enterprises Support Services								
1. Entrepreneurial Capacity Development	15,588	10,392	25,981	1,010	673	1,683	40	6
2. Strengthen Input Supply Services	47,172	70,647	117,819	3,056	4,576	7,632	60	26
Subtotal	62,760	81,039	143,800	4,066	5,250	9,315	56	32
C. Institutional Strengthening and Implementation Support								
1. Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector -	15,450	36,575	52,025	1,002	2,382	3,384	70	12
2. Programme Coordination and Implementation Support Services	52,633	19,826	72,459	3,410	1,284	4,694	27	16
Subtotal	68,083	56,401	124,484	4,412	3,666	8,078	45	28
Total BASELINE COSTS	258,957	183,302	442,260	16,911	11,920	28,831	41	100
Physical Contingencies	4,999	4,469	9,468	324	290	613	47	2
Price Contingencies	47,223	39,939	87,162	1,451	1,229	2,680	46	9
Total PROJECT COSTS	311,179	227,711	538,890	18,686	13,438	32,124	42	111

B. Programme Financing

127. The total combined FReMP investment and incremental recurrent costs, including physical and price contingencies, are estimated at US$ 32.12 million (ERN 539 million). The Programme will be financed by the Government of Eritrea, IFAD grant, Federal Republic of Germany, GEF, FAO and beneficiary contribution. IFAD has confirmed a grant of USD 15 million from IFAD (41.5% of the Programme costs), the Federal Republic of Germany will contribute USD (27.7% of total Programme costs), GEF has committed USD 7.89 million, representing 21.8% of total Programme costs, FAO will contribute USD 0.5 million (1.3% of total Programme costs), and the beneficiaries are to contribute about 3.7% in form of participation in construction or setting up fishery site and purchase of petty inputs like fishing gears. This will cost about USD 1.35 million in monetary terms. The Government will finance the taxes and duties (USD 1.42 million, representing 3.9% of total costs). The details of financing arrangements are shown in Table 2.

Table 2: Financing Plan by Components (USD'000)

Eritrea
Fisheries Resources Management Programme (FReMP)

Components by Financiers (US$ '000)	IFAD		GEF		FAO		Germany		GoE		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Exch.	Taxes)	Taxes
A. Develop Sustainable Fisheries Systems																	
1. Develop Marine Fisheries Production and Post-Harvest Systems	2,757	45.7	2,557	42.3	-	-	26	0.4	194	3.2	504	8.4	6,040	18.8	890	4,955	194
2. Development and Sustainable Utilization of Inland Fisheries	721	15.3	3,951	83.7	-	-	-	-	48	1.0	-	-	4,721	14.7	1,587	3,085	48
3. Market development and Promotion of Fish consumption	1,480	97.2	-	-	-	-	-	-	43	2.8	-	-	1,523	4.7	800	680	43
Subtotal	4,958	40.4	6,508	53.0	-	-	26	0.2	286	2.3	504	4.1	12,284	38.2	3,277	8,720	286
B. Fisheries Enterprises Support Services																	
1. Entrepreneurial Capacity Development	1,702	93.0	128	7.0	-	-	-	-	0	-	-	-	1,830	5.7	732	1,098	-
2. Strengthen Input Supply Services	1,674	18.8	-	-	-	-	5,940	66.7	445	5.0	846	9.5	8,905	27.7	5,340	3,120	445
Subtotal	3,376	31.4	128	1.2	-	-	5,940	55.3	445	4.1	846	7.9	10,735	33.4	6,072	4,218	445
C. Institutional Strengthening and Implementation Support																	
1. Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector -	1,950	52.2	652	17.4	500	13.4	-	-	637	17.0	-	-	3,738	11.6	2,621	481	637
2. Programme Coordination and Implementation Support Services	4,716	87.9	602	11.2	-	-	-	-	50	0.9	-	-	5,367	16.7	1,468	3,850	50
Subtotal	6,666	73.2	1,254	13.8	500	5.5	-	-	686	7.5	-	-	9,105	28.3	4,089	4,331	686
Total PROJECT COSTS	15,000	46.7	7,890	24.6	500	1.6	5,966	18.6	1,417	4.4	1,351	4.2	32,124	100.0	13,438	17,269	1,417

C. Summary benefits and economic analysis

128. **Financial Analysis** – A comprehensive set of financial analyses of the Programme's different investment activities have been undertaken. The analysis of the smallholder enterprise models is developed by building financial budgets and deriving selected financial performance indicators that will be used to examine the impact of Programme interventions on targeted smallholder enterprises and households. Prices of inputs and outputs, as well as all technical parameters used to build the financial models, were derived from information obtained during the design Missions and discussions with entrepreneurs and other relevant stakeholders in the fisheries sector. The results of the financial analyses are summarised below and presented in detail in Appendix 10, Financial and Economic Analysis.

129. FReMP quantifiable direct benefits and beneficiaries stem from the following classes of activities/investments:

Small Pelagic fish	• Fishing co-operatives for small pelagic • Fish processing/value addition co-operatives/ enterprise groups • Fish retailing
Inland Fishing	• Fishing enterprise groups in dams.

130. There are many other complementary activities that will generate benefits beyond the above front line production/trading activities. These include the improved nutrition and Natural Resources Management (NRM) and Capacity Building of MMR Staff.

131. *Beneficiaries* – In total, FReMP is targeting 17,500 households (87,500 people) through 600 groups. The cost per beneficiary is USD 361 (about USD 1,800 per household; assuming that, on the average, a household consists of five people).

132. *Representative Enterprise Models* – The following representative models have been used to estimate both the financial benefits and economic analysis. The results are summarised below and presented in Appendix 10.

Small Pelagic fish	• Fishing co-operatives for small pelagic • Fish processing/value addition co-operatives/ enterprise groups • Fish retailing
Inland Fishing	• Fishing enterprise groups in dams.

133. *The Economic Analysis* – In the overall aggregation, the Programme has the potential to generate an economic rate of return (ERR) of 17% over a 10-year period. The Overall summary below presents the result of the economic analysis.

Table 3: Economic Rate of Return and Sensitivity Analysis

		Reference	Y1	Y2	Y3	Y4	Y5+	Y6	Y7	Y8	Y9	Y10
Fishing co-operatives for small pelagic fish		*Table 6*	*4*	*7*	*14*	*19*	*28*	*32*	*38*	*38*	*38*	*38*
Fish processing/ drying		Table 11	(1.13)	(2.52)	1.69	11.28	21.27	27.30	28.59	28.59	28.59	28.59
Inland fishing		Table 19	(0.06)	0.03	0.28	0.58	0.73	0.73	0.73	0.73	0.73	0.73
Fish trading		Table 15	0.21	0.70	1.34	2.04	2.54	2.74	2.80	2.80	2.80	2.80
Incremental Benefits from NRM activities		Table 21	1.08	5.81	14.62	28.38	42.14	49.88	53.75	53.75	53.75	53.75
Total Incremental Economic Benefits			**4**	**11**	**32**	**61**	**95**	**113**	**124**	**124**	**124**	**124**
Programme economic costs												
	Programme economic costs- ERN millions	Costab	124.5	59.0	120.1	45.2	32.8	24.4	16.5	0.0		
	Recurrent costs after Project closure									6	6	6
Total Programme Economic Costs			124.5	59.0	120.1	45.2	32.8	24.4	16.5	6.4	6.4	6.4
Net Incremental Economic Benefits			(120.8)	(47.6)	(88.5)	15.9	61.8	88.7	107.0	117.1	117.1	117.1
	ERR		17%									
	NPV- Millions of ERN (8%)		125									

134. *Sensitivity Analysis linked to Potential Risks* – A number of scenarios were tested to establish the economic viability of the total Programme in the event of adverse factors. The ERR is relatively stable with regard to cost increases, benefit reductions and time lags. The sensitivity analysis was linked to potential risks associated with the Programme. The ERR ranges from 11-17%.

17%	ERR for Overall Programme- Base Case	Simulated risks
14%	ERR if benefits decrease by 10%	• Catch levels drop • Selling prices fall • Postharvest losses increase
14%	ERR if costs increase by 10%	• Costs of operating inputs increase
13%	ERR if benefits lag by one year	• Lengthy procurement processes • Delays in formation of Cooperatives/ groups
11%	ERR if benefits lag by two years	• Lengthy procurement processes • Delays in formation of Cooperatives/ groups

D. Sustainability

135. This section examines the likelihood of sustaining the outcomes, benefits and impacts of the Programme beyond the Programme implementation period. It identifies the key assumptions underpinning the long-term benefits and highlight measures built-in into programme design that

contribute to a long-term benefit stream. The potential for sustainability is examined from different perspectives.

136. **Institutional Sustainability** – The participatory process of Programme design and the bottom-up planning approach, embracing the key stakeholders, ensures that the Programme design and implementation modalities respond to the target communities' concerns, fisheries sector priorities, national development policies and strategies, and institutional framework. The approach creates ownership and the necessary foundations and commitments for sustainability post Programme. FReMP implementation will be fully embedded within the Government's institutional framework at all levels and these will continue to exist after Programme implementation. The institutional building capacity approach encompassing government institutions at different levels and the cooperatives and enterprise groups will ensure that skills exist to continue supporting Programme-initiated activities after completion.

137. **Economic/Income Sustainability** – The Programme will provide capacity building to the target groups in business plan development for their respective sub-projects. The different trainings will also include aspects on prudent financial management. Cooperatives/enterprise groups will also be linked to markets. Linkages to markets will ensure that the cooperatives/enterprise groups have an avenue through which to dispose of their production. As long as the established linkages prove to be mutually beneficial, the long-run outcome would be sustainability of incomes for the parties involved. The financial analysis of the Programme indicates that the different cooperative/enterprise group members will improve their income and earn good returns on their investments. These financial benefits on investments in the sector, coupled with the improved access to inputs, will not only promote sustainability but enhance replicability and scaling-up. The availability of a revolving fund, through the CCU, provides opportunities to the good performing cooperatives/enterprise groups to expand their businesses in the long-run.

138. **Environmental and Climatic Sustainability** – A detailed review of environmental and climate risks with appropriate risk management strategies is presented in Appendix 12. The Programme will promote environmentally sustainable fishing practices by adopting the precautionary approach, including promoting and enforcing good fisheries management practices. FReMP's interventions will support planned adaptation to climate change through: a) investing in "climate buffers" (i.e. watershed management, increasing water and soil retention to reduce the impacts of droughts and extreme rainfall, and rehabilitation and planting of mangroves, safeguarding their important role in the coastal ecosystem); b) integration of expected climate change impacts into dam management plans (i.e. increased evapotranspiration and changes in streamflow); and c) integration of expected climate change impacts into feasibility studies for infrastructure, such as multi-purpose facilities (i.e. sea-level rise). Finally, the Programme's support to MMR on data collection and analysis will be valuable to get a better understanding of climate change impacts in the coastal ecosystem.

Appendix 1: Country and rural context background

1. More than two decades after attaining independence in 1993, Eritrea is still faced with many development challenges. The main economic sectors are yet to fully recover from the effects of 30 years of war, leading to a state of massive unemployment, few income generating opportunities and general poverty. The situation has been worsened by periodic droughts which, given the country's dependence on rain-fed agriculture, make it highly vulnerable to food and nutrition insecurity. The country continues to face foreign exchange shortages, making it difficult to meet its import needs, thus forcing it to operate at lower levels of capacity. In addition, shortages of skilled manpower continue to hinder the country‘s development ambitions. In terms of the Human Development Index (HDI)[28]. Eritrea was ranked 186th out of the 188 countries reported in 2015, while the country also scored poorly in the global hunger index (GHI)[29] with a GHI score of 33.8 in 2014.

2. Nonetheless, recent economic performance has been positive, driven mainly by the mining sector (details are contained in Annex 1). Real Gross Domestic Product (GDP) growth is estimated to have increased from 2.0% in 2014 to 2.1% in 2015, double the rate in 2013. Going forward, growth is expected to further benefit from a revitalised housing and construction sector, infrastructure development, and continued improvements in public financial management. Agriculture, animal husbandry and fishing remain the mainstay of the Eritrea population, with approximately 70% of the population relying on this sector for their livelihoods. The growth outlook is promising if Eritrea exploits all its opportunities for trade and opens to foreign investment other than in the mining sector. The country is aiming at creating a modern, private sector-led economy (Macro Policy 1994; National Indicative Development Plan 2014-2018)[30]. However, the attainment of this objective is still being limited by an inadequate enabling investment and business environment, United Nations sanctions, and overall weak macroeconomic conditions. The Government of Eritrea (GoE) has placed high priority on building an efficient national government and developing its own capacities to manage policies and productively exploit the country’s abundant natural resources for sustainable socio-economic development (Ministry of Land, Water and Environment, 1997). Eritrea’s resources include arable land (26% of the total, but only 4% under cultivation) and minerals (copper, gold, iron ore, nickel, silica, sulphur, marble, granite and potash). The current GDP composition is: services (59.9%), non-manufacturing (17.3%), agriculture, hunting, forestry and fisheries (16.9%) and industry (5.9%). Over the medium term, the government sees further prospects in improved trade with Middle-Eastern and Asian countries, additional mining activities, growth of the food sector and the development of the tourist industry.

3. Exports are estimated to have grown in 2014-15, due to mineral production at the Asmara project, but the current account balance is estimated to have deteriorated from 0.2% of GDP in 2014 to -1.2% in 2015 and is forecast to be -1.5% of GDP in 2016. This is partly due to decreases in both remittances and the ‘development and recovery tax’ (a 2% tax levied on the Eritrean diaspora). Based on the International Monetary Fund (IMF) Article IV 2009, Eritrea is a pre-decision point Highly Indebted Poor Country (HIPC) and is therefore eligible or potentially eligible for HIPC Initiative multilateral debt relief (MDR). However, no discussions on an IMF-supported programme have been initiated, although the Government is engaged with the IMF’s capacity-building institute through the East African Regional Technical Assistance Centre (E-Afritac), located in Tanzania, and has also agreed to participate in the African Development Bank’s Transition Support Facility.

4. The medium-term outlook could present some risks because of the size of the fiscal and current account deficits, coupled with high inflation. Improved management of these conditions and enhanced control of the exchange rate regime and public debt could attract more private investment. Thus, medium-term economic prospects will be influenced by: a) tensions over the border with Ethiopia, which are a basis for high security infrastructure expenditure; b) relations and co-operation with the international community; c) implementation of the regional programme on drought resilience and sustainable livelihoods under the Intergovernmental Authority on Development (IGAD), plus capacity building under the African Development Bank’s new Transition Support Facility; d) increasing

[28] The Human Development Index Report is produced by UNDP (2015): http://hdr.undp.org/en/2015-report
[29] GHI is produced by the International Food Policy Research Institute and is an aggregated measure of four key indices, namely; overall undernourishment, child wasting, child stunting and child mortality: http://www.ifpri.org/topic/global-hunger-index
[30] African Economic Outlook; AfDB, OECD, UNDP 2015.

investments in the mining sector, and e) continued engagement with Middle-Eastern and Asian countries.

5. With regard to poverty in Eritrea, the analysis indicates that it is most severe in the coastal plains where high temperatures and lack of water constrain agricultural development. Although the coastal area was once home to a strong fisheries sector, decades of war brought the sector to the point of collapse. The poor were disproportionately affected by the war and by drought and many have struggled to re-establish their livelihoods having lost assets, such as boats and livestock. Nutrition has been recognized as a major development issue, of which about 50% are below 18 years. Up to 44% of children below 5 years are reportedly stunted, while 35% are underweight and 15% suffer from wasting. Food insecurity in Eritrea is attributed mainly to climate-related factors that affect the people's capacity to produce enough food. But, there are also technological, policy, demographic and macro-economic issues that need to be addressed to have lasting impact. Fortunately, the country has abundant and under-exploited fisheries resources, both in its marine waters in the Red Sea and in inland water reservoirs, which could greatly contribute to, and diversify, national food security, reduce the incidence of poverty and malnutrition, and create employment opportunities.

6. The scarcity of reliable statistics makes it difficult to establish the country's rural poverty situation with certainty but based on different reports, including the Interim Poverty Reduction Strategy Paper, it is clear that over 60% of the rural population are poor and at least 30% live in extreme poverty. However, interventions by the Government and its development partners have been contributing variously to improve some aspects of people's lives. Life expectancy at birth is now estimated at 62.3 years, up from 50 years only a decade ago. The overall improvement emanating from government and development partners' programmes is reflected in the country's performance concerning the achievement of the Millennium Development Goals (MDGs). It is estimated that the country has performed well with regard to three of the eight UN MDG[31] and these include: a) MDG 4 – Reduction of Child Mortality; b) MDG 5 – Improvement of Maternal Health; and MDG 7 – Ensure Environmental Sustainability. However, the country has made less progress towards the eradication of extreme poverty and hunger (MDG 1) and the attainment of universal primary education (MDG 2). Though adult literacy has improved, enrolment and retention indicators continue to lag behind. Despite significant advancements made towards gender parity (MDG 3), substantial improvements, particularly with regard to female representation in the workforce and in national assembly, are still needed to meet this target. Lack of data has made it difficult to assess progress made towards MDG 8 – Global Partnership for Development.

7. Although the majority of the population still rely on agriculture, animal herding and fishing for their survival, the sector only accounts for about 16.9% of GDP and about 20-30% of commodity exports (Agriculture Sector Strategy, 2014). This low contribution to GDP and exports is attributed to highly variable climatic conditions, inefficient traditional farming methods, limited resource allocation, and low profit margins. Moreover, private-sector activity, dominated by trade and services, remains weak, and access to hard currency is a major constraint. The fact that over 80% of the poor live in rural areas and depends on agriculture suggests that increasing agricultural production and productivity would have a significant impact on poverty. For this to happen, it would require modernising the sector through shifting away from the current farming systems and crops to semi-commercial and peri-urban agriculture; small-scale irrigated horticulture, commercial farming, and agro-pastoral spate irrigation systems based on flash flooding ("spates"). The recent AfDB Board approval of the regional on Drought Resilience and Sustainable Livelihoods Program (DRSLP) under IGAD will enable the government to strengthen greatly the resilience of communities, especially in the rural areas.

8. In the forthcoming National Indicative Development Plan (NIDP) 2014-2018, the government has given priority to three pillars: human resource development, infrastructure development and food security. There have already been targeted public investment programmes in education and skills development and in agricultural production and productivity improvement. The GoE is continuing to implement the Strategic Partnership Cooperation Framework (SPCF) 2013-2016, signed with the UN system in 2013, focusing on five strategic areas: basic social services; national capacity development;

[31] United Nations Development Programme (UNDP) in Eritrea.

food security and sustainable livelihoods; environment; and gender equity; and the advancement of women. The government is also committed to engaging with countries to the East due to its geostrategic location and cost-effective means of doing business. Moreover, its long coastline could offer maritime services to countries in East and Central Africa as well.

Annex 1: Eritrea Country Data Sheet

Land area (km^2 thousand)	124	GNI per capita USD 2011 (AfDB)	430
Total population (million) June 2015	3.65 million[32]	GDP per capita growth annual % 2013	3.9
Population density people per km^2		Inflation consumer prices annual % 2014 (EIU)	12.2
Local currency	Nakfa	Exchange Rate USD1	15.38
Total Rural population (million) (2015)	2.37	GDP USD million (2014)	3,857
Rural poor population (2015)		Real GDP growth (annual %) 2014	2
Population growth (annual %) 2015	2.8	GDP per capita 2014 USD	
Birth rate /1000 people (2015)		External Debt USD million (2014)	955.6
Death rate/1000 people (2015)		**Sectoral Distribution of GDP 2014[33]**	
Infant mortality rate/1000 live births (2012)	48	% agriculture	17
Life expectancy at birth (years) (2012)	62.3	% industry	6
Total labour force (2015)		% non-manufacturing	17
Female labour force as % of total (2015)		% services	60
School enrolment primary (% net) (2012)	35.6	General government final consumption expenditure as % of GDP (2011)	21.1
Adult illiteracy rate (%) (2008-2012)	68.9	Private final consumption expenditure as % of GDP (2011)	77.7
Internet users /1000 inhabitants (2012)	53.7	Gross domestic saving as % GDP (2014)	
Malnutrition prevalence height for age (% of children <5) (2015)		Public debt per capita USD (2014)	
Malnutrition prevalence weight for age (% of children <5) (2015)		**Balance of Payments USD million**	
Health expenditure total (as % of GDP) (2014)		Merchandise exports FOB (2014)	504.9
Population using improved water sources (%) (2014)		Merchandise imports FOB (2014)	1,149.7
Population using adequate sanitation facilities (%) (2014)		Current account balances USD m	-306.1
Representation (%) in Parliament (female) (2013)	22		
Human Development Index ranking (2011)	182 out of 187 countries	Before official transfers (2014)	
Forest area as %of total land area (2014)		After official transfers (2014)	

[32]Economist Intelligence Unit estimates the 2014 country's population at 6.5 million
[33]African Economic Outlook 2015

Land use as % of land area (2014)		Foreign direct investment net (2014)	
		Government Finance	
		Cash Surplus/deficit as % of GDP (2014)	
		Total expense (% of GDP) 2014	
		Present value of external debt as % of GNI 2014	
		Total debt service (% of GNI) (2014)	
		Lending interest rate (%) 2014	
		Deposit interest rate (%) 2014	

Source: UNDP, EIU, AfDB

Appendix 2: Poverty, targeting and gender

1. **Rural Poverty –** According to the I-PRSP (2004), about 65% of the rural population are poor, and 37% are in extreme poverty. However, interventions by the Government and its development partners over the years have been contributing variously to improve some aspects of people's lives. Life expectancy at birth is now estimated at 62.3 years, up from 50 years only a decade ago. A study undertaken in 2001(MND/IFAD) indicated that 85-90% of the poor rural households are food insecure in bad years and 25-40% even in good years. The proportion of food insecure households is higher among the crop farmers and pastoralists than agro-pastoralists, indicating that livelihoods diversification reduces vulnerability to drought and crop failures. Some degree of malnutrition is estimated to affect 64% of the total population (World Bank 2007) and 38% of children under five years exhibit stunted growth. The rural population in Eritrea also has limited access to public infrastructure and basic services; only 57% of rural households have access to improved water sources, and only 52% of school age children in rural areas attend primary school.

2. Whilst poverty is most severe in the lowland arid zones (where 36% of the national population live), the greatest number of the poor live in densely populated highlands where population pressure results in small and fragmented land-holdings. The poorest Zobas are Northern Red Sea and Anseba in the Eastern and Western lowlands respectively, while Maekel, in the Central Highlands, is the least poor. The poor were disproportionately affected by the war and drought and many who lost their assets, including homes and livestock, are still struggling to re-establish their livelihoods.

3. Generally, the lowest-income groups are smallholders undertaking rain-fed agriculture, and pastoralists as well as internally-displaced peoples (IDPs), expellees from Ethiopia, women headed households (WHHs) and the elderly. Coping strategies amongst these groups include: a) income diversification (selling firewood, water, handicrafts, or small goods); b) sale of assets (jewellery, household furniture, farm tools, and livestock); c) receiving support through remittances or reliance on friends and relatives; and d) internal migration for employment. The disabled and aged groups survive on Government welfare. Only the wealthiest 10% of the rural population have sufficient income and assets to make them food secure at all times, although they also suffer during a prolonged drought as witnessed in 2000-2002. The fragile ecosystem and unfavourable climate are amongst the most important causes of food insecurity and poverty in Eritrea.

4. **Rural livelihood in the Programme area and gender division of labour –** Highland plateaux as well as lowlands and coastal areas characterize the Programme area, with diverse agro-ecological features and livelihood systems practised by the population [34]. Approximately 70 per cent of the country's population resides in rural areas and predominantly relies on crop agriculture, livestock and fisheries for employment and income generation. Arable land accounts for only 12% of land use of which 95% is rain fed-dependent agriculture and irrigation accounts for about 5%.

5. In areas that have climates that vary from semi-arid to humid (highlands) and contain nearly all of the important areas for cereal cultivation, the livelihood is mostly based on a mixed crop-livestock system. The types of rural livelihoods traditionally practised in this area includes crop-based farming system, and agro-pastoral. More specifically, these include: a) traditional rain fed cereal cultivation; b) mixed agriculture combining crops and livestock (where crops are more important); and c) irrigated and diversified crop production.

6. Inland fisheries are an unexploited resource with production making up only 5 percent of the annual estimated Maximum Sustainable Yield by the Ministry of Marine Resources (FAO, 2002). The centre of inland fisheries is located in the central zone of the country at 1800 metres above sea level and includes experimental ponds (Araya & Head, 2012).

7. The lowland zones are mainly arid or semi-arid with a crop growing period of up to 90 days though in arid areas it is much shorter. Agro-pastoralist system combines livestock and crop activities (with dominance of livestock) while pastoralism based on livestock rearing is practised with seasonal

[34] There are 9 ethnic groups in Eritrea: which are classified on the basis of language as well as socio-cultural characteristics. These are: Afar, Bilen, Hidareb, Kunama, Nara, Rashaida, Saho, Tigre and Tigrinya.

migration or without migration. Inland fishery is not traditionally practised and is a newly introduced complementary livelihood, especially in the western lowlands, where dams and reservoirs have been constructed.

8. On the coast, traditional livelihoods include marine fishery. Inland coastal areas have desert-like climate and saline soils which limit agricultural production. Most families depend on fishing. Men and women work in agriculture and fishery and gendered divisions of labour exist in both sectors. They depend on regional agrarian system, ethnic affiliation and other socio-economic and cultural factors.

9. In the coastal areas, men do all of the actual fishing on boats. Fishermen use traditional motorized wooden boats (Houri: traditional wooden boats with outboard petrol engines, and Sambuks: wooden boats with inboard diesel engines) and a limited number of fishers using improved motorized fibre-glass boats. Women are not part of crews but make up 50% of the workforce in beach seining (foot fishing). Women also contribute to the harvesting of fisheries resources, such as catching small pelagic fish, collecting sea snails, net making and mending, fish processing and marketing. A number of widows, estimated at about 5% of the fishing population, who have inherited their husbands' fishing assets, hire out their boats for fishing. Women's participation is traditionally higher in working in fish processing, small scale drying/salting/smoking. Currently, these processes are undertaken in a traditional way; this is time consuming and results in low hygienic conditions.

10. Given that male fishers spend a lot of time at sea, greater burdens are being placed on female household members with respect to child care, household tasks and shore-based income earning activities such, as animal husbandry and agriculture.

11. In inland areas, fishery is a newly promoted livelihood activity. There have been few pilots in villages where community members have received training and awareness raising on inland fishery and also nutrition and cooking practises (i.e. 8 villages in Zoba Maekel). In inland fishery (in few pilots developed), while men do all the fishing, women are involved in the processing and marketing.

12. **Target Group** – The target group of the Programme consists of: a) small-scale fishers (i.e. men and women that are either small boat owners, crew members, foot fishers) that will be dealt with either as individuals or as cooperatives/groups; b) rural smallholders (non-fishers mainly involved in subsistence agriculture and keeping small livestock) living around the target water reservoirs in inland Zobas and interested to engage in economic activities along selected links of the inland fisheries supply chain. This group also includes smallholders living and involved in rehabilitation of the catchment areas of the target water reservoirs; c) youth entrepreneurs (fishers and non-fishers including young men and women accounting for 30% beneficiaries) interested in establishing business enterprises/cooperatives to respond to market demand for fishery products and services; d) women and women headed households (WHHs) accounting for at least 30% of the Programme's beneficiaries; and e) demobilised soldiers and Internally Displace People (IDPs). The number of target beneficiaries per area of intervention is presented in Annex I.

13. **Small-scale Fishers –** In the coastal areas, the target group consists of small scale artisanal fishers using boats and canoes, foot fishers (mainly women and youth) and also crew members. The target group is located in the villages along the Red Sea Coast in ZSRS and ZNRS, and who are linked to the landing sites where they deliver fish. Those fishers are using traditional motorized wooden boats (Houri: traditional wooden boats with outboard petrol engines, and Sambuks: wooden boats with inboard diesel engines) and a limited number of small-scale fishers using improved motorized fibre-glass boats. The artisanal fishermen operating motorized boats are registered and their number has been estimated at about 3,300, of which 1,112 belong to the fishers' cooperatives. The registered small-scale fishers own about 793 boats of which 602 (76%) are owned by the cooperative members. A major limitation of these boats is their small size with a capacity of 0.5-1.0 tonne. Their small size also limits the fishing range and the quantity of catch per trip. Most of the boats are currently not functional either due to age, lack of maintenance as a result of shortage of spare parts, inadequate gear, infrequent supply and high cost of fuel.

14. FReMP will provide support to the above small boat owners to help improve their plight. However, efforts will be put in forming new cooperatives of fishers belonging to the lowest income

group. FReMP will form 30 new fishers' cooperatives (dealing with large fish) , targeting particularly the lowest income earners and asset-less people, such as crew members, foot fishers who will be organized in groups and will be sharing the assets as well as the earnings. The new approach in the formation of the new cooperatives will enable those individuals to share assets as a group, enter into the production and gradually improve their incomes.

15. Formation of cooperatives will see involvement of women and youth (at least 30%). As part of the small pelagic production and market linkage, activities such as processing, value adding, market and enterprise development are likely to see a higher level of women's participation (it is estimated to likely exceed 30%) targeting adult women as well as young women and WHHs[35].

16. The higher level of interest and presence of women will depend on the traditional division of roles within the fisheries value chain. As part of the small pelagic value chain's investment, FReMP will introduce technologies like solar driers in the processing facilities. It is expected that these facilities and technologies will be used mainly by women. They will be benefiting not only from the new technologies (resulting in time saving) but also from improved hygienic conditions as well as getting access to water for multiple use. The construction of fish processing plants will include water infrastructures which will also be used for domestic purposes. This will reduce women's time and energy with regard to fetching water.

17. In addition to the above and as a result of lessons learned from FDP, formation of 6 women's cooperatives for net making and mending will be supported. It is expected to involve about 120 women.

18. **Rural Smallholder Households** – In inland areas, the target group will comprise low income households of communities living around the 15 water reservoirs. They engage mainly in rain-fed agriculture using poor production practices, although some are engaged in irrigated agriculture. The lowest income groups are smallholders cultivating only rain-fed crops and have smaller plots of land. The Programme will facilitate participation from members of communities living in the catchment area around the reservoirs stocked with fish. Based on the interest of the groups, as well as respecting gender division of labour, young men will be mainly involved in the fishing activities (using boats), while women (young women as well as women and WHHs) will participate in activities for processing and marketing fish.

19. Communities around the reservoir will be engaged in catchment conservation and eco-system management interventions (covering an estimated 17, 000 ha) from which households will derive direct benefits as well as underpinning the viability and sustainability of the fishery activities in and around the target water reservoirs. As a result of the conservation activities, the inland catchment area beneficiaries will also benefit from improved crop and livestock production.

20. **Women and Women Headed Households** – The cultures and traditions of all the ethnic groups in Eritrea constrain the socio-economic activities of women, particularly in rural areas, though change is underway. Women have equal opportunities. However, women by tradition are largely limited within the home and village, and burdened by domestic chores including fetching water and firewood and caring for children. Women also have lower literacy/numeracy rates; about 40% of girls leave school at an early stage to get married.

21. One of the main social problems of war has been the high number of WHHs, widows and orphans – in most Zobas more than 40% of households are headed by women. A participatory poverty assessment carried out in 2002-2003 showed that about 65% WHHs (30-50% of all rural households) were absolutely poor as against 28% for male-headed-households (MHHs). Only about 3% WHHs were found to be well–off compared with 12% for MHHs; MHHs had livestock herds three times those of WHH. Debub and Maekel are the Zobas that have predominantly women-headed households. Poor women in rural areas are often found in low paying manual labour in agriculture or construction. Because of the lack of male labour (particularly for ploughing), many WHHs are forced to enter into share-cropping arrangements, or rent their fields against a portion of the harvest. This is

[35] Greater details on specific production and market linkage activities and likelihood of target groups participation are reported in table I.

not always beneficial to them since they are not able to subsist on crops and are forced to find supplementary income-generating activities elsewhere.

22. The GoE has active policies supporting equal opportunities for women, with special attention for women's education and promotion of equal opportunities in higher education. Affirmative action regulations also exist, stipulating the minimum number of women in community courts, land tenure committees, farmer groups and other local-level decision-making bodies.

23. The Programme will support women, and in particular WHHs, to increase their incomes through value-addition in the fisheries sector with a specific focus on processing and through micro-businesses. As an incentive for inclusion of WHHs in cooperatives, proposals presented by aspiring cooperatives with membership that include at least 30% WHHs would receive preferential consideration. FReMP gender strategy will be developed in alignment with the main gender strategy at the national level.

24. **Youth –** The youth represent about a third of all citizens in the country and its mobilisation on the labour market is of great concern and importance. The youth in rural areas are faced with the dual challenge of wanting to explore alternative livelihood opportunities to subsistence farming or small-scale fishing yet with little formal training and access to input to equip them to face the labour market and enterprise development. Most of the youth involved in agriculture and fishing sector are at subsistence level and they are mostly asset-less.

25. Youth definition applied to FReMP is the one adopted by the African Union which extends parameters to define youth from 15-35 years of age. A variety of overlapping power dynamics are at play when it comes to the different challenges and opportunities for young women and men's inclusion in agricultural value chains: capacity to engage in labour markets; marital status; gender; legal status; education; and, independence from senior household members. For example, a married female farmer of 24 years old with two children and an educated young man of 19 years old are likely to have different aspirations requiring different interventions[36]. Age and gender are key social factors defining a young person's life opportunities. While young people tend to have limited economic independence, this is more acute for young women and girls. Early marriage and pregnancies affect women and girls' mobility and ability to defy established norms and gain access to knowledge, training or engage in commercial activities.

26. The Programme will promote employment opportunities for youth though the creation of groups, micro and small enterprises (MSEs) in coastal and inland communities by investing in: a) the identification of profitable markets with growth potential for MSE fishery products and services; and b) awareness creation in coastal and inland communities and the identification of entrepreneurial women and young labour market entrants, particularly young crew members on fishing boats and foot fishers; landless and near landless and unemployed youth.

27. **Internally Displace People and Demobilised Soldiers** – IDP and returnees resettled in existing villages or new settlements without or limited access to land, livestock or off-farm employment opportunities. They are considered as the most disadvantaged, together with demobilised soldiers. Absence of effective programmes to assist demobilized soldiers to re-integrate into rural communities and inadequate training and finance to engage in off-farm enterprises make these groups particularly vulnerable. The Programme will seek to establish them in fishing operations to improve their livelihoods and in income generating activities.

28. **Targeting Mechanisms** – FReMP will use a variety of mechanisms to ensure that the target households and the vulnerable (i.e. WHHs) have access to Programme benefits. The targeting strategy will be guided by the following targeting mechanisms:

- **Geographic targeting –** FReMP will be national in scope covering all six Zobas including the coastal areas and inland areas, particularly targeting water reservoirs for aquaculture and up-country fish markets. The Programme will be site-specific and will operate in areas with

[36] Bennell, 2007, 2010.

selected dams, principally to promote effective and sustainable inland fisheries to boost household incomes and nutrition for rural population. With regard to selection of the inland water reservoirs for the inland fisheries activities, the following will be considered: a) high potential for fish production; b) low risk of drying out; c) high opportunities for community participation; d) accessibility (as indicated by the presence of a community of potential users); and e) the degree of watershed conservation and/or ongoing watershed conservation activities;

- **Self-targeting measures** to ensure that Programme interventions respond to the priorities and livelihood strategies of the target groups. The strategy will also ensure that selected entrepreneurial activities are suitable for all groups, in particular women and the youth;
- **Direct targeting mechanism –** This will ensure that specific groups, particularly the vulnerable and disadvantaged (such as women, WHHs, IDPs and demobilised soldiers) are selected to participate in Programme interventions. The Programme will include quotas to ensure their inclusion (not less than 30% for women inclusion) as well as specific activities targeting the other vulnerable groups. In particular, WHHs will be targeted to benefit from specific activities and incentive mechanisms introduced to favour their participation. About 120 women will be exclusively involved in net making and mending and it is expected that the processing and marketing-related activities of the supply chain for the small pelagic fish will involve 80% of women. Entrepreneurship groups for fish processing and marketing in the inland fisheries will exclusively benefit women. Also, about 30% of the youth is expected to constitute part of cooperatives, particularly for the inland fisheries. IDPs and demobilised soldiers will have priority in participating in income generating activities along the different supply chains;
- **Empowering measures** – In addition to developing technical skills in fishing and related fishing activities and enterprises, the Programme will support beneficiaries to develop skills in household nutrition, basic literacy and numeracy, business and leadership, especially for women. Most significantly, the household methodology will help deepen Programme impact by fostering more equitable gender roles and relations at household and group levels. The methodology will also be used to improve the performance of cooperatives, groups, small scale fishermen, etc. by identifying common areas of interest, addressing inequalities and strengthening mutually-beneficial linkages.

29. The Programme will employ inclusive targeting mechanisms to ensure the participation of low income and vulnerable households with a specific focus on poor rural households whose livelihoods revolve around the use of the natural resources of the coastal area of Red Sea as well as dams in the highland and low lands.

30. With regard to selection of beneficiaries, communities and groups will be encouraged to participate in Programme interventions through the use of participatory methodologies. The selection of beneficiaries will follow a community-based process, whereby identification and inclusion of the poorer and vulnerable households will be supported and informed by the community in the first place and also by data available in the Zobas databases, detailing household status, including resettled households. General guidelines to identify the very poor will include information contained in the lists of poor families receiving (or not) the social assistance from the Government. The selection process will be done in collaboration with Zoba and Kebabi administrations, community members (men and women) and the National Union of Eritrean Women association (NUEW) as well as Youth and Student Association (with whom the Programme may collaborate for implementation of specific activities). NUEW is the NGO mandated as Eritrea's national machinery for the advancement and implementation of the National Policy on Gender which provides a framework for the integration of gender equality in national development planning. Priority areas of the policy are legal reforms and access to justice, political, economic and social empowerment, education, training and health. The gender policy provides for the assignment of gender focal persons in each ministry to coordinate and facilitate gender mainstreaming.

31. The responsibility of mainstreaming gender into programmes and projects is the collective responsibility of all national institutions. NUEW is, however, mandated to co-ordinate gender mainstreaming activities and to be the lead advocate for Eritrean women. NUEW projects include advocacy and awareness raising, training and supply of credit and economic empowerment projects. In addition, NUEW has members on a number of committees at community and Zoba levels, such as in village councils, Farmer's Advisory Services (FAS) committees, local development committees, land distribution committees. Its considerable outreach and presence on the ground and good relationships with government departments at all levels are the strengths of NUEW. With a strong presence at national, Zoba and kebabi levels, NUEW is well placed to support gender mainstreaming as well as community mobilisation, awareness creation-related activities and be a potential partner for implementation of FReMP's gender strategy.

32. **Monitoring Targeting Effectiveness –** At the start of the Programme and the confirmation of the specific set of activities to be implemented, a detailed list of useful gender and age disaggregated indicators will be identified for activities, outputs and outcomes, along with a more detailed list of activities with corresponding target groups. Similar considerations will be taken when developing the baseline and end-of-Programme surveys. Programme documents and reports will include explicit social and gender data and analysis. The Programme will equip its personnel and other community facilitators to conduct qualitative analysis of results and determine if there are any observed changes in gender roles and results in the new emerging livelihood trends among the different social groups as a result of Programme interventions. Appropriate training will be provided to staff of implementing agencies to enable them to identify and encourage participation of target groups. Efforts will be made to engage low-income earning households particularly women and WHHs in decision making processes during implementation. The baseline survey will include gender and socio-economic analysis as well as capture youth related issues.

33. **Capacity Building and Household Methodology –** as part of the capacity building activities, selected tools of household methodologies will be applied for enhanced gender responsiveness. MMR staff (about 49, including extension staff) at zoba level will receive training in household methodologies. Household methodologies will be used in capacity building activities related to nutrition as well as production outcomes. Inequalities in gender relations at the household level have a direct impact on production and productivity, and on other desirable development outcomes, such as education, food security and nutrition. Several tools from the Gender Action Learning System (GALs, part of the household approaches) will be used for gender sensitization and awareness creation. The Household Methodology will be particularly applied to promote fish consumption and improve dietary intake at household level and therefore to accelerate benefits to the target group.

34. **Why mainstream HHM?** HHM are innovative approaches that aim at ensuring gender equality and social inclusion. HHM addresses the causes of social exclusion and gender inequalities, rather than only treating the symptoms, and experiences demonstrate deeper and more sustainable improvements in rural livelihoods. Benefits are numerous: ownership, high quality of beneficiary participation, empowerment, sustainability plan, etc. Individuals, households and communities move out of poverty and create positive changes. The methodology is proven to increase impacts when mainstreamed to agricultural/rural development operations.

35. **What is HHM?** HHM are community-led processes that foster changes at various levels, from the individual to the household, and from the household to group/community. The methodology relies on a vision of wealth creation and involve all household members in achieving that. It increases awareness of gender roles and inter-generational issues by engaging both women and men, youth and elders to negotiate their needs and interests. It results in a more equal share of: non-productive and productive tasks, decision-making power and control of assets, food security/nutrition, benefits and incomes, allowing significant and sustainable improvements in household dynamics and well-being. Afterwards, empowered individuals and households catalyse changes in their groups/cooperatives and communities through peer sharing and training. One of the most effective household methodology is the Gender Action Learning System (GALS).

36. **How to mainstream?** Three basic phases are recommended: pilot HHM in one or two rural communities, assess the results and the modus operandi to replicate/upscale within the whole project

area. As projects play a role of facilitation, HHM are upscaled by communities. The rule is one household to reach out to 5 others but experiences have shown high ratio of 1 for 60 when integrated in groups/cooperatives. HHM also provide tools for a participative poverty and gender monitoring.

37. Under FReMP household methodologies will be used in capacity building activities under Component 3. Inequalities in gender relations at the household level have a direct impact upon agricultural production and productivity, and on other desirable development outcomes, such as education, food security and nutrition. Household methodologies involve working with all household members towards achieving a common household vision.

38. In FReMP, the methodology will be implemented at group level targeting 350 households selected from the Programme targeted area. In farmer/fishers empowerment, the methodologies will be used to ensure that organizational goals are inclusive, address issues of power and gender, and strengthen mechanisms for dialogue. Initial skills development at the group level on household methodologies will be replicated at the household level supported by peer group members and trained facilitators. This will ensure that the empowerment achieved by individual group members is translated at the household level.

39. Several tools from the gender action learning system (part of the household approaches) will be used for gender sensitization, awareness creation and for improved gender equity in agricultural production and marketing. Once group members have mastered the methodology, they will be encouraged to replicate the visioning exercise at the household level. Group and community facilitators will provide peer support to individual members to address challenges raised at the household level. Other tools will be used to address various gender and socio-economic issues. Such tools will include (but not limited to) the gender balance tree, challenge action tree, livelihood road journey, income and expenditure tree, and will be used flexibly according to the context.

40. The IFAD targeting and gender checklists (see tables below) will complement, provide guidance and support implementation of the above detailed strategies and implementation approach.

COMPLIANCE TO IFAD'S TARGETING POLICY - CHECKLIST FOR DESIGN

IFAD Targeting checklist	**Design**
1. Does the main target group - those expected to benefit most- correspond to IFAD's target group as defined by the Targeting Policy (poorer households and food insecure)?	FReMP's will target about 17,500 households of fishers and non-fishers; this corresponds to 87,500 people (using a national average of 5 people per household). Of the total beneficiary households, about 10,000 households will be in the 11 targeted sub-Zobas in the coastal Zobas and 7,500 households in the inland Zobas. They are engage in small scale fishery and subsistence agriculture, are food insecure and belong to the lower income groups (especially women, WHHs and youth). The Programme's primary target group will be a) small-scale fishers (i.e. men and women that are either small boat owners, crew members, foot fishers) b) rural smallholders (non-fishers mainly involved in subsistence agriculture and keeping small livestock) living around the target water reservoirs. Target groups present vulnerability to socio-economic and environmental factors (in particular those along the coastal area) youth who may migrate, women head of household, IDPs and demobilised soldiers, belonging to the very poor and disadvantaged groups. Generally, the lowest-income groups are smallholders undertaking rain-fed agriculture, and pastoralists as well as internally-displaced peoples (IDPs), expellees from Ethiopia, women headed households (WHHs) and the elderly.
2. Have target sub-groups been identified and described according to their different socio-economic characteristics, assets and livelihoods - with attention to gender and youth differences?	Yes. The programme target group is described in 2 main categories as small scale fishers and small holder households, corresponding to the lowest income group and also: women, women head of households, youth IDPs and demobilised soldiers. All gender and youth differences are reported and

	response from the programme to tackle the issues is identified.
3. Is evidence provided of interest in and likely uptake of the proposed activities by the identified target sub-groups? What is the evidence? (Matrix on analysis of project components and activities by principal beneficiary groups completed?)	Yes. There is a huge demand for forming groups and cooperative to increase access to inputs, market as well as fishery production, processing and employment opportunities for unemployed youth. The fishery production and market linkages supported by the programme reflect activities that are already traditionally practised in the coastal region, while introduces fishery in the inlands as an alternative and profitable economic activity to complement existing livelihoods. Men are mostly involved in the fishing activities, while women in the processing and market. Youth interested in forming groups, entrepreneurships and entering into viable economic opportunities and employment. Matrix of analysis of programme activities by beneficiaries is presented in annex II.
4. Does the design document describe a feasible and operational **targeting strategy** in line with the Targeting Policy, *involving some or all of the following measures and methods:*	
***4.1 Geographic targeting** – based on poverty data or proxy indicators to identify, for area-based projects or programmes, geographic areas (and within these, communities) with high concentrations of poor people*	FReMP will be national in scope covering all six Zobas including the coastal areas and inland areas, particularly targeting water reservoirs for aquaculture and up-country fish markets. In the coastal area the programme will operate in 11 sub Zobas and around the landing sites. There are a total of eight landing sites most of which are well established with good infrastructure. These include: Massawa (Ghibi), Massawa (Erifish), Dahlak, Galaelo in ZNRS; and Assab, Tio, Eddi, and Barasole in ZSRS. In the inland Zobas (Anseba, Debub, Gash Barka, and Maekel), the Programme will be site-specific and will operate in areas with selected dams, principally to promote effective and sustainable inland fisheries to boost household incomes and nutrition for rural populations. Inland reservoir selection will follow: a) high potential for fish production; b) low risk of drying out; c) high opportunities for community participation; d) accessibility (as indicated by the presence of a community of potential users); and e) the degree of watershed conservation and/or ongoing watershed conservation activities.
***4.2 Direct targeting -** when services or resources are to be channelled to specific individuals or households*	Quotas (not less than 30%) will be set to include women, WHHs and youth. In particular, WHHs will be targeted to benefit from to specific activities and incentive mechanism introduced to favour their participation. About 120 women will be exclusively involved in net making and mending and it is expected that the processing and marketing activities around the small pelagic fish will involve 80% of women. Entrepreneurship groups in the inland for fish processing and marketing will exclusively benefit women. 30% of youth is also expecting to be part of cooperatives as well as forming led-youth groups (particularly in the inlands). IDPs and demobilised soldiers will have priority in participating in income generating activities along the VC.
***4.3 Self targeting –** when goods and services respond to the priority needs, resource endowments and livelihood strategies of target groups*	VC development is key for all targeted population and involvement of all target groups, men, women, women head of household and youth, IDPs and demobilised soldiers. It will create economic empowerment for all. Soil and water conservation as well as watershed protection and rehabilitation are vital for the livelihood of inland communities.

***4.4 Empowering measures** - including information and communication, focused capacity- and confidence-building measures, organisational support, in order to empower and encourage the more active participation and inclusion in planning and decision making of people who traditionally have less voice and power*	FReMP activities are highly empowering the beneficiaries including women, youth, IDP and demobilised soldiers; they build social and psychological self-confidence hand in hand with economic empowerment and governance of local resources. Capacity-building will target individual fishers and non-fishers' households, their organisations as well as extension service providers and will be following the principles of community driven development approach. The programme will consider the existing committees, local representation including hose of women and youth. Mobilisation strategy will be encouraging women and youth participation in relevant decision making bodies.
***4.5 Enabling measures** – to strengthen stakeholders' and partners' attitude and commitment to poverty targeting, gender equality and women's empowerment, including policy dialogue, awareness-raising and capacity-building*	The programme will establish collaboration with the Nation Union of Eritrean Women, NUEW, the NGO mandated as Eritrea's national machinery for the advancement and implementation of the National Policy on Gender which provides a framework for the integration of gender equality in national development planning. The gender policy provides for the assignment of gender focal persons in each ministry to coordinate and facilitate gender mainstreaming.
***4.6 Attention to procedural measures -** that could militate against participation by the intended target groups*	Procedural measures and selection criteria will be addressed to prevent interference in selection of the poorest programme areas/elite capture. Possible procedural obstacles to women and youth and the lower income groups' access to economic opportunities are also analysed and addressed. Specific criteria for beneficiaries' selection will be detailed and respected during the mobilisation and selection process.
***4.7 Operational measures** - appropriate project/programme management arrangements, staffing, selection of implementation partners and service providers*	While the ultimate responsibility poverty targeting, gender & youth focus lies with the programme coordinator, implementing partners will be required to demonstrate gender responsiveness as well as ability to engage with youth. Implementing staff will receive proper capacity building.
5. Monitoring targeting performance. Does the design document specify that targeting performance will be monitored using participatory M&E, and also be assessed at mid-term review? Does the M&E framework allow for the collection/analysis of sex-disaggregated data and are there gender-sensitive indicators against which to monitor/evaluate outputs, outcomes and impacts?	Monitoring and evaluation of poverty targeting, gender and youth focus will be part of the programmes' supervision schedule. This will include; One supervision mission and one follow-up mission annually; and a Mid-term review. Progress on these issues will be reported in the programme's progress reports. All people-centred indicators will be disaggregated by gender and age, and enriched by qualitative information and analysis. Reporting on poverty targeting, gender and youth focus will be part of the reporting requirements.

IFAD's KEY FEATURES OF GENDER-SENSITIVE DESIGN AND IMPLEMENTATION

IFAD gender checklist	Design
1. The project design report contains – and project implementation is based on - gender-disaggregated poverty data and an analysis of gender differences in the activities or sectors concerned, as well as an analysis of each project activity from the gender perspective to address any unintentional barriers to women's participation.	The poverty figures for Eritrea indicate that poverty is affecting poor rural women more than men, and in particular WHHS. Gender differences are analysed in the social, physical, financial assets that make women more vulnerable and with low access to key production assets as well as access to productive resources. Direct targeting activities for women have been included. The programme includes activities that are traditionally performed by women and are highly favouring their participation. These include women's involvement in processing of fish, especially the small pelagic fish, as well as value adding and marketing in the supply chain.
2. The project design report articulates – or the project implements – actions with aim to: • Expand women's economic empowerment through	Women will be engaged in all activities and trainings proposed by the programme: business and market skills to

access to and control over productive and household assets;	access inputs and programme services, in particular in the fishery production and market linkage women will be involved in processing and marketing fish. Quotas for participation in groups/cooperatives will enable them to access productive inputs. Overall, FReMP would enhance women's access to market and thereby enable them to accumulate human, social, physical and financial assets.
• Strengthen women's decision-making role in the household and community, and their representation in membership and leadership of local institutions;	Women and youth participation in community-based committees is highly encouraged. At grassroots level the work of the National Union of Eritrean Women, as well as the work of Youth and Student Association promote representation of those groups into local committees and formation of women and youth leaders. These committees are present in each village/district and include representatives of local leaders and community representatives with attention to equitable women and youth representation. Collaboration with those partners will help to ensure that the same representation will be ensured in committees involved in FReMP activities. In particular, for Natural Resource Management. For what concern formation of cooperatives, the programme would enhance women's participation and voice in decision-making by setting a target of 30% women for Cooperative and Association participating in the programme and will encourage women participation in decision-making bodies/committees, in line with the gender strategy in place promoted by the NUEW.
• Achieve a reduced workload and an equitable workload balance between women and men.	The Programme will support the introduction of time and labour saving technologies that reduce drudgery for women. Such technologies will include access to water through facilities built around the fish processing plants for public access to water for the communities (domestic use of water) and also introduction of fish solar driers.
3. The project design report includes one paragraph in the targeting section that explains what the project will deliver from a gender perspective.	Yes. The gender-related and social inclusion aspects of the programme are summarized in the section on programme area and target group.
4. The project design report describes the key elements for operationalizing the gender strategy, with respect to the relevant project components.	Operationalization of the gender strategy will be undertaken in collaboration with key implementing partner. The programme design already identifies (i) the distinctive characteristics of male and female producers (fishers/non fishers) of different poverty levels and specific activities that benefit the target groups; (ii) identify opportunities and measures required to promote their inclusion in the supply chains. The implementing partners will support and mainstream on this basis gender and inclusion issues into programme implementation and specific service providers/partners will be identified to undertake mobilisation and selection of beneficiaries to promote women inclusion. A well placed partner would be National Union Eritrean Women (NUEW)
5. The design document describes - and the project implements - operational measures to ensure gender-equitable participation in, and benefit from, project activities. These will generally include**:**	
5.1 Allocating adequate human and financial resources to implement the gender strategy	All actions identified in the Gender Strategy have been properly costed and budgeted. Gender and community development focal persons from potential implementing

	partners (i.e. NUEW) will be appointed to ensure that women are participating in the programme activities as equal partners, and that issues specifically related to women are being adequately addressed. The programme will support training of staff which will include modules on gender and social inclusion. Particularly o Community Driven development principles.
5.2 Ensuring and supporting women's active participation in project-related activities, decision-making bodies and committees, including setting specific targets for participation	This will be achieved through the use of a strong mobilization strategy and sensitization activities at start-up of the programme and also during implementation. Gender sensitization would be part of the process of engagement with the communities. Women should be at least 30% of individual association//groups/cooperative members.
5.3 Ensuring that project/programme management arrangements (composition of the project management unit/programme coordination unit, project terms of reference for staff and implementing partners, etc.) reflect attention to gender equality and women's empowerment concerns	The terms of reference for the programme coordination unit PCU will reflect responsibility for gender focus and social inclusion and supervision of the overall work. Capacity of the programme implementers (and partners) on GEWE will be strengthened through trainings, capacity building and implementation support. The Programme Coordinator has overall responsibility for ensuring that the gender strategy is prepared and implemented, however the implementation will be responsibility of service provider or key partners (i.e. NUEW) for its implementation.
5.4 Identifying opportunities to support strategic partnerships with government and others development organizations for networking and policy dialogue	FReMP is built on a strong partnership base bringing together alongside the Government of Eritrea and lesson learned from previous and current interventions to support women' economic empowerment. It is particularly relevant the work of the "home economics" of Ministry of Agriculture, carrying out several programme to train households, particularly on nutrition and promoting IGA to increase the living standards of rural families and provide trainings to men and women. The work of NUEW is also particularly relevant: NUEW is the NGO mandated as Eritrea's national machinery for the advancement and implementation of the National Policy on Gender which provides a framework for the integration of gender equality in national development planning. Priority areas of the policy are legal reforms and access to justice, political, economic and social empowerment, education, training and health. The gender policy provides for the assignment of gender focal persons in each ministry to coordinate and facilitate gender mainstreaming.
6. The Programme's logical framework, M&E, MIS and learning systems specify in design – and project M&E unit collects, analyses and interprets sex- and age-disaggregated performance and impact data, including specific indicators on gender equality and women's empowerment.	The baseline survey will include a gender analysis. This will provide a basis to track women's empowerment through programme support. All relevant logical framework indicators (i.e. all those dealing with people) will be sex-disaggregated.

Annex I: FReMP Beneficiaries by Area of Intervention

Programme area: Coastal area					
Sector	**Programme intervention**	**Target groups**			**Beneficiaries**
Marine Fishery Production and market linkage		Small scale fishers Households	Women, including WHHs (at least 30%)	Youth: young men 50% and women 50% age 15-35 (at least 30% in total)	Individuals (HHS x 5)
	Fishing co-operatives for small pelagic	1,500	30%	30%	
	Fish processing/marketing co-operatives/ enterprise groups	1,800	50%	30%	
	Additional co-operatives for large fish	450	30%	30%	
	Fish retailing co-operatives	25	30%	30%	
	Co-operatives for foot fishers	300		100%	
	Entrepreneurs for boat/engine repair	14	-	100%	
	Co-operatives for net making/mending	120	100%	-	
Subtotal beneficiaries Fishery Production and market linkage		**4,209 HHs**	**1,621 W**	**1,455 Y**	**21,045**
Improved Nutrition And Natural Resources Management (NRM)	Mangrove management Costal afforestation Bee keeping (IGA) Nutrition trainings and related activities (i.e. promotion, demonstration)	5,761 HHs	30%	30%	28,805
Subtotal beneficiaries Nutrition and NRM		**5,761 HHs**	**1,728 W**	**1,728 Y**	**28,805**

Subtotal beneficiaries In the Costal Area		**10,000 HHs**	**3,242 W**	**3,183 Y**	**50,000**
Programme area: Inland					
Sector	**Programme intervention**	**Target groups f**			**Beneficiaries**
		Smallholder Farmers Households	Women Including WHHs (at least 30%)	Youth: young men 50% and women 50% age 15-35 (at least 30% in total)	Individuals (HHs x 5)
Inland Fishery Production and market linkage	Fishing enterprise groups in dams.	315		100%	
	Enterprise development	300	100%		
Subtotal beneficiaries Fishery Production and market linkage		**615 HHs**	**300 W**	**315 Y**	**3,075**
Improved Nutrition And Natural Resources Management (NRM)	Catchment area rehabilitation /conservation Nutrition training s and related activities (i.e. promotion, demonstration)	6,885	2,065	2,065	34, 425
Subtotal beneficiaries in Nutrition and NRM		**6,885 HHs**	**2,065 W**	**2,065 Y**	**34,425**
Subtotal beneficiaries in the Inland Area		**7,500 HHs**	**2,365 W**	**2,380 Y**	**37,500**
Total beneficiaries in program rural area		**17,500 HHs**	**5,607 W**	**5,563 Y**	**87,500**

Capacity Building MMR staff					
Sector	**Programme intervention**	**Target groups**			**Beneficiaries**
	Trainings	**MMR staff**			**Individuals**
Capacity Building	MCS training				40
	Stock assessment training				25
	Nutrition				49
	Household methodology				49
	Extension				40
	Food safety and standard				30
	Certification and branding				20

	Data base management and data analysis				20
	Assets financing procedures				22
Subtotal beneficiaries Capacity building					**295**
Total beneficiaries of FReMP					**87,645**

Annex II: FReMP Cooperatives/Groups by Area of Intervention

Enterprise	Number of Cooperatives	Individuals per group	Total
Pelagic fishing	200	15	3000
Fishery enterprises (processing, preservation, value addition, marketing)	120	15	1800
Large fish fishers (new)	30	15	450
Inland fishing (5 Group of 5 in 4 Zobas)	20	5	100
Foot fishers	20	15	300
Gear making/repair	20	15	300
Boat/Engine repairers	14	1	14
New women groups (Net repair/making)	6	15	90
Inland Processing and Marketing (Enterprise Groups)	15	20	300
Mariculture	4	15	60
Total			**6414**

Appendix 3: Country performance and lessons learned

1. Considering that Eritrea has not undergone a Country Programme Evaluation (CPE) is recent years, the performance of the country programme was largely assessed by reviewing the Project Completion Reports of closed Projects and MTR and Supervision reports for ongoing Programmes/Projects. Overall, the country programme is assessed as satisfactory. IFAD's engagement with Eritrea started in 1995, just two years after the country's independence. Since that time, a total of six Programmes/Projects have been designed and implementation of three of those Programmes/Projects has already been completed. The first two IFAD-supported Projects in Eritrea (the Eastern Lowlands Wadi Development Project (ELWDP) in the Northern Red Sea Zoba (1995-2006), and the Gash Barka Livestock and Agricultural Development Project (GBLADP), in Zoba Gash Barka (2003-2009), focused on reestablishment of independent livelihoods for crisis-affected rural households following drought and war, strengthening Zoba administrations and improving the capacity of communities and producer organisations. While these two Projects largely achieved their objectives, there was still a considerable need to help with the process of reestablishment of independent livelihoods for crisis-affected rural households.

2. The third Programme, the Post Crisis Rural Recovery Development Programme and its Add-On (PCRRDP and PCRRDP Add-On) was designed and implemented during the period 2007-2014. The Programme focused on agricultural and livestock development, natural resource management, capacity building and institution strengthening. The Programme goal was to contribute to alleviation of rural poverty, improvement of food security, and enhancement of the livelihoods of poor rural households, particularly the Women-Headed Households (WHHs). The development objective was to raise agricultural productivity and production while conserving and improving the agricultural resource base. The complementary objective (PCRRDP Add-On) was the amelioration of the impact of the drought and global food crisis and soaring global food prices through an acceleration of agricultural and livestock production using improved access to agricultural inputs. Consistent with the Government's desire, the focus of the Programme on Gash Barka and Debub, the two Zobas that suffered extensively during the war, and with a large number of Internally Displaced People (IDPs), expellees and returnees from Ethiopia.

3. It was established that, overall, the Programmes' performance was satisfactory. PCRRDP and its Add-On had a positive impact on household incomes, assets and the livelihoods of the target beneficiaries in general. Higher incomes were mainly drawn from: a) increased dairy milk production; b) production of manure; c) small stock and poultry production; d) chick pea production; and, to some extent also from, e) sorghum and millet (up to 30% income increase). Income increases from crop production were limited due to the negative effects of subsequent droughts. Higher incomes were generally used for further income diversification as they enabled many beneficiaries to engage into activities, such as petty trade (running small grocery shops, renting out of donkey and cart, etc.). Women-Headed Households (WHHs) particularly performed better due to the direct targeting approached used. This has contributed to reduced poverty and improved livelihoods of those target groups. With regard to assets, it was established that 49% of the target beneficiaries had access to potable water. About 39% had access to electricity, compared to 7% at the beginning of the Programme. The percentage of houses with 2 rooms increased from 54% to 67%. Also, 41% of the houses had a cement floor, compared to 8% before the Programme. Asset ownership further increased for TV (from 33% to 98%), mobile phones (from 2% to 9%) and bicycles (from 6% to 40%).

4. Food security is estimated to have improved by 67%, with 80% of the households found to be food secure at the end of the Programme, compared to 48% before. The improvement was most pronounced in Zoba Debub where 88% of the households were found to be food sufficient compared to 34% before the Programme. Also, 62% of the households were found to have food reserves exceeding their most immediate needs, compared to 24% before the Programme. Food security was improved both directly and indirectly. It was directly improved due to the availability of larger quantities and a broader variety of products (introduction of dairy products and increased consumption of livestock products in general). Household nutrition has changed dramatically with 70% of the households having included fruits, vegetables, milk, eggs, pulses, etc. in their diet. Household food security indirectly improved through higher incomes, which have been used to improve and diversify household diets. WHHs and smallholder farmers without livestock, who represented the poorest and

most food insecure at appraisal, have particularly benefited through activities such as small stock and poultry production.

5. Because of the achievements of the PCRRDP and its Add-On, it was established that, while environmental management still presents challenges, especially in light of climate change, the country is no longer in a post-crisis situation and, hence, the need to refocus IFAD's strategic framework in the country from post-crisis to structured development. Accordingly, the subsequent Programmes/Projects were largely developmental in nature. To address environmental related issues, the fourth Project, Catchment and Landscape Management Project (CLMP), was designed and its implementation is still ongoing (2010-2016). Its focus is on natural resources management. The fifth Project, the Fisheries Development Project (FDP), was declared effective in late 2010 and its completion is due in September 2016. FDP aims at raising productivity of small-scale fishers in the coastal region where opportunities for agriculture are limited by the desert-like climate. Thus far, it has been established that the Project is contributing to the overall objective of the IFAD country programme of poverty reduction and improved national and household food and nutrition security. The sixth Project is the National Agricultural Project (NAP) whose main focus is on agricultural water resource and infrastructure development, integrated agricultural production, and strengthening support services. NAP's specific objective is to enhance food security through increased agricultural production and productivity and improved access to safe and nutritious food at household level. The Project's implementation is due for completion in December 2018. Based on implementation progress reports, indications are that the Project is generally on course to achieving its objective.

6. From IFAD's country portfolio of completed and ongoing Programmes/Projects, there are many lessons learned of relevance to FReMP. A selection of such lessons and their design implications is provided hereunder:

- A participatory design process and implementation arrangements which involve key stakeholders in the industry, as well as jointly defined short and long-term objectives are important for sustained development. FReMP design has been very participatory involving stakeholders ranging from MMR all the way to the target communities. In addition, FReMP will promote a community-based and participatory approach in programming and implementation, strengthening grassroots institutions. This will redress this weakness and simultaneously contribute to minimize potential conflicts during the course of implementation;
- Productivity enhancement by itself does not necessarily increase fishers'/farmers' incomes without proper linkages to markets and/or value addition opportunities. The Programme is incorporating specific interventions aimed at linking fishers' to markets;
- Training in fishing techniques and other technical aspects are important but should be accompanied with training in simple business decision making, business management and financial control. As such, the Programme has incorporated training on technical aspects, entrepreneurship and group dynamics;
- More success can be achieved from simple, low-cost investments and technologies built around the capacities of communities in management and maintenance. The investments and/or technologies to be made/introduced under FReMP will be well within the capacities of the target group to ensure effective management and maintenance;
- The application of indigenous knowledge and technology should be promoted, and this can be invaluable in the management of fisheries resources. Planning of activities during FReMP implementation will employ a bottom-up and approach and, as such, the Programme will build on existent indigenous knowledge and technologies to ensure acceptability and sustainability of the different interventions;
- Stronger fishersfishers-extension-research linkages are important for setting research priorities, technology development and knowledge management. FReMP will ensure that all piloting/research activities involve the target communities to facilitate the effective uptake and scaling up of technically and economically proven technologies;
- Promotion of organisations with a clear business objective is important but the decision to organize should be the sole decision and responsibility of the people and organisation, such organizations must have a legal base. The Programme will create awareness about the advantages of belonging to an organisation that encourages and works towards the attainment of agreed objectives but will play only a facilitation role with regard the formation

and registration of the organisations; the decision to organise will entirely be made by the people;

- While there are an extensive number of options for addressing rural poverty and food security issues, it is important to carefully select instruments that respond to the needs of poor rural households. These will vary geographically and temporally, depending on the local environment, social/cultural differences and availability of infrastructure and services. FReMP will involve the target groups in influencing many of the interventions through a bottom-up planning approach;
- It is important to ensure that Programme coordination, management and implementation arrangements are well integrated into the decentralized regional administration at the outset. Harmonization and alignment of these arrangements with national policies, procedures and institutional framework augurs well for sustainability. FReMP coordination, management and implementation are well integrated into GoE's decentralized administration. Thus, the Programme will emphasise decentralisation of responsibility and empowerment of the beneficiaries since these are essential for successful implementation and sustainability;
- Financing arrangements including credit should take proper account of technical and credit risks, administrative costs, and be backed by appropriate recovery arrangements. FReMP will strengthen the CCU's structure and capacity to manage and supervise its operations and, to the extent possible, streamline the collection of repayments to minimise the likelihood for defaulting by addressing technical and credit risks and therefore provide safeguards to the sustainability of the interventions. In addition, the administrative costs would form part of the 'mark-up' that borrowers would be made to pay as part of the cost of borrowing;
- New Programmes/Projects tend to take a long time to effectively take off. This is attributable to a number of factors. The most commonly cited factor relates to the protracted process of recruiting the Programme/Project staff. In addition, when the staff are on board, there is a need for the newly recruited staff to get acquainted to the IFAD processes and procedures. It is, therefore, recommended that, efforts be made, whenever possible, to retain the good performing staff from the preceding Programme/Project to help provide a good start for the new Programme/Project;
- Experience has shown that Programmes/Projects tend to encounter difficulties in undertaking baseline surveys/studies in a timely fashion. In many cases, such surveys/studies get undertaken years after Programme/Project activities have already been initiated and, as a result, get a distorted situation of pre-existing conditions. To that effect, it is a good practice to undertake baseline studies/surveys as part of Programme design;
- Potential for women's participation must be clearly defined but attention must be given to socio-cultural conditions. FReMP has included targeting measures that do not only clearly define and ensure women's participation but also pays attention to social-cultural conditions of the target areas;
- Rehabilitation of watershed/catchment areas is essential for the sustainability of inland water reservoirs and the associated activities. Accordingly, FReMP has specified activities and a budget for watershed/catchment area management;
- Force Account – In situations of widely spread/scattered small investments and where private sector capacity is generally weak, well-managed use of force account could be a good mechanism to undertake the necessary civil works activities;
- In procurement, framework contracts can be very effective in minimizing the cost and effort wasted in preparation of multiple similar small procurement processes by agreeing fixed prices with a supplier for a set period of time;
- Women are key to addressing household food security and nutrition goals. To that effect, it is important to ensure that specific activities are targeted for/oriented towards women during Project/Programme design;
- Experience from research and extension has emphasised the need to recognise the existence of useful local technologies and innovative farmers that can contribute to expediting the development of improved technologies acceptable to smallholders. Hence, close collaboration between farmers, the extension system and researchers should be encouraged to ensure that research priorities, technology development and dissemination respond to the socio-cultural and economic needs of the smallholders;
- Fisheries Asset Financing – Past experience regarding the supply of inputs to fishers on credit shows that the repayment rates were extremely low. In an effort to put in place a self-

sustaining financing mechanism, FDP has introducing a revolving fund system and linking it directly to the marketing system. That way, repayments are collected at source, overcoming logistical obstacles to collection along the sparsely populated coastline;

- A participatory programme design and implementation within Government policy, strategy and institutional framework are important for effective implementation, cost effectiveness and sustainability;
- Monitoring and evaluation is a weak link in the process of rural and agricultural development in Eritrea. Experience has shown that the impact emanating from different Programmes/Projects is not properly consolidated and consistently documented. Thus, particular attention needs to be paid to establishing simple but effective monitoring and evaluation systems for future development Programmes/Projects.

Appendix 4: Detailed FReMP description

1. This appendix describes FReMP's two technical components in detail. It identifies the main work processes that will need to be further detailed in the Programme Implementation Manual.

2. **Outcomes.** The Programme aims at achieving two complementary outcomes:

a) Outcome 1: Production and market linkage for fisheries (marine and freshwater fisheries) developed and increased volumes of fish delivered to consumers; and
b) Outcome 2: Viable fisheries enterprises are developed and requisite inputs are accessed on a sustainable basis.

3. **Components.** FReMP's outcomes will be achieved through the effective implementation of two technical components which are subdivided into five subcomponents supported by capacity building and implementation support services.

4. **Component 1: Develop Sustainable Fisheries Systems (USD 11.4 Million) –** The component will support the establishment of necessary infrastructure, and technologies for production and post-harvest operations, marketing and consumption of both marine and inland fisheries. This will be achieved through a set of three subcomponents.

5. ***Subcomponent 1.1: Develop Marine Fisheries Production and Post-Harvest Systems*** – The subcomponent will focus on putting infrastructure and technologies in place for the effective and sustainable production of fish and fish products that would be linked to markets. Eritrea's marine fishery sub-sector includes cold and dry fish production and market linkages supplied by industrial fishery[37] (mainly licensed foreign fishing vessels) and artisanal fishers operating at least four types of fishing boat technologies. The cold supply chain is well established and deals with large pelagic fish and demersal species, including commercially valuable reef dwelling fish, such as groupers, snappers and emperors. The demersal fish include lizardfish and breams, while the large pelagic fish include jacks, trevallies, mackerels, tunas and sharks. The dry fish supply chain handles mainly the small pelagic sardines and anchovies, but is poorly developed following years of conflict from which it has not fully recovered. The Programme will address some of the major development challenges facing the country's marine fishery sub-sector at both production and post-harvest levels. At the production level, the country has not fully re-built its national fishing fleet following years of conflict and does not have enough capacity to fully utilize its EEZ. This affects both the large pelagic and demersal fish entering the cold supply chain as well as the small pelagic fishery destined for the dry fish supply chain.

6. At postharvest level, the fishery infrastructure at landing sites is not adequate to accommodate all the landed fish and, in particular, electricity is only available on a few landing sites, this limits the capacity to produce enough ice for the cold supply chain. Some of the landing sites presently need infrastructure rehabilitation and upgrading. The processing, distribution and marketing activities in the cold chain are dominated by a single player, the National Fishing Corporation (NFC), who plays a big role in market and price decisions. The situation is even more constraining for the dry fish production and market linkage where there is only one small establishment processing the small pelagic fish for the production of fishmeal destined for the animal feed industry; there is no formal processing and distribution/marketing channel for human consumption. Lack of postharvest processing facilities to appropriately process/preserve catch, thus, limits the longevity of the product, results in poor fish quality and increases wastage. This is compounded by lack of accredited fish quality laboratory which could enable fish exports.

7. FReMP interventions will take place mostly at landing sites along the coast, but some activities will extend higher up in the supply chain – for instance to distribution and retail levels. The interventions under this subcomponent are expected to focus on: a) ice-making facility for the cold fish

[37] Typically, the goal of an industrial fishery is to catch as many fish as possible for economic gain. This carries with it various risks of overfishing of a fish population, causing the fishery to 'crash', among several other dangers. The size of the boats used is usually on the larger end with the commensurate amount of capital invested per man-on board.

supply chain; b) fish drying facilities for the small pelagic fish; c) Pilot Mobile Solar Fish Dryers; d) establishment of multi-purpose facilities at three centres to facilitate business services delivery; e) innovative fish-based value addition technologies and product development, and; f) formation of an umbrella cooperative[38] for the purpose of national distribution and marketing of small-pelagic fisheries.

8. *Establish Ice-Making Facility at one Fish Landing Site to Support the Cold-Fish Production and Market Linkage* – The cold fish production and market linkage has received development assistance from the Government and development partners, including IFAD through the Fisheries Development Project (FDP). This has contributed to improvements in fisheries infrastructure at the major fish landing sites, such as Massawa, Assab, Gellalo, Tio and Eddi. However, the facilities would not be sufficient to handle the expected increase in fish production resulting from Programme interventions. In particular, there will be increased demand for ice by additional fishers supported by the Programme. FReMP will aim to lessen this gap by supporting the construction of one ice making facility with capacity to produce at least 24 tonnes of ice per day and with fish cold storage rooms to hold fish before transportation to inland markets. MMR, in consultation with other key stakeholders, such as the NFC and fishers' cooperatives, will determine the most appropriate location for the new investment. Other factors to be considered include: a) the targeted volumes of fish to be landed on the site; b) strategic location at a reasonable distance from other similar facility; and, c) availability of electricity on the site. A business and sustainability plan will be developed for the ice making facility to ensure it can be run on sound business principles. The plan should clearly define the ownership/lease arrangements. FReMP support will include training personnel for efficient operation of the ice making facility.

9. *Construct Solar Fish Drying Facilities at Four Landing Sites to Handle Increased Volumes of Small-Pelagic Fish* – FReMP has a strong focus on the dry fish production and market linkage. The interventions under the Programme are expected to result in increased output of high quality dried pelagic fisheries, especially for human consumption. The small fish are traditionally dried in Eritrea by spreading it out in the sun on a sandy beach. Open air sun-drying, a common practice in many other developing countries, leads to poor quality products as fish is exposed to dust, rain and wind, soiling, contamination with microorganisms and possible infection with disease-causing germs.

10. FReMP will intervene by constructing solar fish drying facilities for the small pelagic fish at strategic points along the coast. These will be established at four landing sites, of which one site will be in ZNRS and three sites in ZSRS, where there is more intensive fishing of small pelagic fish. The proposed sites are Dahlak in ZNRS and Tio, Eddi and one other site to be identified in the ZSRS. MMR, in consultation with other stakeholders and using the most current fish production data, will identify the ideal sites and the land lease related issues. FReMP will provide Technical Assistance (TA) support for the design, specifications and installation of the solar drying facilities. Other options to consider include technical partnerships with specialized United Nations technical agencies in this field, such as the United Nations Industrial Development Organisation (UNIDO), Food and Agricultural Organisation (FAO), etc. to provide the needed technical expertise.

11. In addition, the Programme will support the enabling facilities and services for hygienic fish processing, including access to piped water and sanitary facilities at the targeted landing sites and proper fencing of the facilities to keep off predators. Supply of piped water to the landing sites will have additional public utility benefits to the communities in the neighbourhood. To maximize the gains from improved drying technology, there will be need for changes in services and practices in other aspects of this supply chain, including storage and transport facilities, improved hygienic conditions of fishing boats, better product handling and improved packaging.

12. *Pilot Mobile Solar Fish Dryers in Smaller/Temporary Fish Landing Sites* – Small pelagic fishes are generally migratory in nature. Accordingly, fishers may be expected to move in between the major landing areas for significant periods. While the big landing sites will continue to receive most of the fish on a continuous basis, there is a need for smaller mobile fish drying facilities that fishers can set up on particular sites temporarily for relatively short durations and shift with them to other fishing

[38] The umbrella cooperatives is envisaged to become independent and run as a private enterprise, thereby taking control of the dry fish production and market linkage, requiring minimal investment in transportation system and network. The Production and market linkage Function Analysis proposes establishment of the umbrella cooperatives through savings.

areas along the coast. These may be in form of light solar racks covered by Ultra Violet-treated solar tents. Detailed designs will be produced to reflect the local situations and scale of fishing operations. FReMP will support such facilities for operation in five smaller fish landing sites. The design of the mobile solar fish drying rack will take the following into account: a) low cost technology, which is easily replicable and adaptable to different local situations; b) use mostly local materials and can be readily fabricated and mounted; c) light but adequately sturdy material and frames; d) ease to clean in order to maintain hygiene standards; e) should not destroy product flavour and other desirable properties; and f) durable with a use life of at least two years. MMR Zoba branches will manage the pilots and will define ownership or leasing arrangements for demonstration facilities which can allow their use by fishers and fish processors cooperatives. Following successful demonstration of mobile solar fish dryers, additional facilities can be constructed on a needs basis as required by users. The Programme has made provision for such cooperatives to access asset financing through which they can acquire the facilities as their private business assets.

13. *Establishment of Multi-Purpose Facilities at Three Centres to Facilitate Business Services Delivery* – FDP established multi-purpose facilities at four landing sites in order to consolidated fisheries support operations and services under the same roof . The model proved to be very useful in terms of ease of service delivery, exchange of information and complementation of activities. FReMP intends to build on this successful experience by supporting the establishment of three additional multi-purpose facilities on fish landing sites but with a particular focus towards the small pelagic fishery, which was not included under FDP. Furthermore, these will be the landing sites that did not benefit in this regard from FDP. Each of the multi-purpose facilities will comprise: a) a facility for net making/repair to be operated by women enterprise groups; b) a facility for boat engine repair to be operated by youths trained in this trade; c) a store for CCU supplies to be managed by the CCU Zoba branch; d) an office for the fisheries extension/inspection agent; e) housing/accommodation for the extension/inspection agent; and f) a facility/room for training. The arrangement to have extension agents, CCU operations and the new enterprise groups under the same roof will provide opportunities for capacity building, faster processing of input financing and to readily and more conveniently access relevant services. More significantly, the women groups making nets can readily sell their products through the CCU retail stores within the same complex. The facility will be developed with a clear business plan detailing the ownership/lease arrangements and means of financing, possibly in form of rent payments by the business units operating within.

14. *Undertake Pilots of Different Processing/Value Addition Technologies* – The small pelagic fisheries has presented FReMP with opportunities of introducing new techniques and preparation of innovative products and recipes. Under this subcomponent, such innovations will be piloted to test the viability of the production processes, assess the market potential and economic viability of the products. The techniques and fish products to be piloted include solar-dried assortments, pickling, fish powder, protein concentrates, salted-pressed, cooked-sundried, fish snacks, fermented products, fish oil, fish sauces, different fish recipes, etc. The demonstrations will be undertaken by an appropriate service provider under the oversight of the Marine Resources Development Department of MMR. The successful products will be introduced to fish processing and marketing enterprise groups for commercial uptake. To ensure faster adoption, the trials will be implemented in a participatory learning process. The initial products formulations and testing will be done in the institutional food laboratories to clearly understand and chart the production process and procedures. The enterprise groups will then be slowly introduced into the trials through targeted capacity building, encouraging and supporting them to prepare some of the products. This will ensure they acquire the skills and the interest early enough in this initiative and gain from further extension support by MMR. Enhanced capacity building and support in identifying niche markets will place them in a position that they can produce higher value products from small pelagic fish for the Eritrean markets, and possibly exportable to the region. The Programme has made a provision for the enterprise groups to access input financing for commercial scaling up of viable value-added fish product development technologies.

15. *Pilot Mariculture Technologies* – FReMP will pilot mariculture technologies at selected sites along the Red Sea coast, aiming to achieve the following: a) identify suitable sites and establish the feasibility of the selected species and systems; b) establish pilot programmes of which successful ones can serve as models for up-scaling; c) develop the science, technology and human resource base to support up-scaling of successful trials and establishment of extension, training and

information systems. The Programme will support research on other potential mariculture technologies for increased productivity of groupers; the species has the potential for increased uptake in domestic and export markets (additional information is presented in Annex 2 (Marine Cage Culture of Groupers) of Appendix 14). MMR has recently established a Mariculture Research Centre along the coast, and this will be provided with support to spearhead the mariculture research in conjunction with the COMSAT and other relevant institutions.

16. ***Coastal ecosystem management –*** Fisheries, possibly more than any other modern food production system, depend on the health and natural productivity of the ecosystems on which they are based. In terms of the coast, this means that FReMP is obliged to look after the marine ecosystems that are most crucial to fish – and thus to livelihoods. FDP established multi-purpose facilities at four landing sites in order to consolidated fisheries support operations and services under the same roof . The model proved to be very useful in terms of ease of service delivery, exchange of information and complementation of activities. FReMP intends to build on this successful experience by supporting the establishment of three additional multi-purpose facilities on fish landing sites but with a particular focus towards the small pelagic fishery, which was not included under FDP. There will be an emphasis on mangrove management by groups: a mixture of planting and management through protective 'social fencing'. Sustainable use will be permitted for livestock fodder (through cut and carry) and honey enterprises stimulated. Afforestation with suitable species will also feature (possibly the halophyte *Casuarina equisitifolia* or equivalent species). There will, furthermore, be use of the invasive *Prosopis juliflora* which can be both utilised and simultaneously controlled by encouraging preferential use of this species for firewood. In this situation, improved, more efficient cooking stoves will be promoted learning from the successful Catchment Landscape Management Project (CLMP).

17. ***Subcomponent 1.2: Development and Sustainable Utilization of Inland Fisheries –*** The focus of this subcomponent will be to augment the Government of Eritrea's efforts to develop inland fisheries in order to complement the marine fisheries resources towards meeting the increasing fish demand in the rural and urban areas as an alternative/complement of meat products. MMR has stocked fish in water reservoirs, which are currently not being utilized by local communities to improve their nutrition and incomes. This is largely because the local communities do not have the skills and equipment to harvest and utilize the fisheries in the reservoirs and, apparently, they are not fully aware of the nutritional benefits of consuming fish. To respond to this need, FReMP will assist all concerned stakeholders to develop and implement management plans for the resources and a system through which local communities can sustainably use the fisheries. This will include establishing and building capacity of fishing enterprise units, mainly composed of youths, and fish processing/marketing enterprise groups run mostly by women. The groups will be facilitated to acquire the inputs for fishing, fish processing and marketing (refer to Component 2). The interventions on inland fisheries will take place in the four inland Zobas – Anseba, Debub, Gash Barka, and Maekel. The Programme will target a total of 15 water reservoirs which will be selected through a transparent criteria, with the objective of developing a model that can be replicated by the Government, other development partners or local communities in other water reservoirs. An inventory of the existing water reservoirs is presented in Appendix 15 (Table 1 & Table 2), providing information on their area, water carrying capacity, fish stock status and production potential. FReMP will start with 6 water reservoirs and gradually extend to the other reservoirs as the programme gains new lessons and experiences. Based on the current information the following water reservoirs have been proposed to start with; Adi-Shaka, and Toker in Zoba Maakel; Bdho, Diga Harnet and Sememo in Zoba Debub. However, there will be need to validate the data and provide additional information especially on their catchment conservation and production status, human and livestock populations

18. *Develop Reservoir and Catchment Management Plans* – FReMP will prepare an overall framework, in form of guidelines, for developing reservoir and catchment management plans. These guidelines will define the principles, process, scope and key players in preparing a reservoirs management plan for each of the 15 reservoirs under the Programme, which will include management of the catchment above the reservoirs – ensuring their resilience and ecosystem integrity. The Reservoir Management Plan will contain information on: a) current and future water resources available, including impact of climate change through increased evapotranspiration and changes in streamflow and temperature; b) current and expected water users; c) expected environmental impacts of fisheries (i.e. on water quality); and d) water management byelaws to ensure water quality and equitable water distribution. Emphasis will be on a participatory community-driven process to ensure

local ownership and sustainability of dam management initiatives. The management plans will be implemented through the existing institutional arrangements and should define the roles to be played by MMR Zoba branches, reservoir Water Users Associations (WUAs) and all other stakeholders. It may also consider if there is need to form a sub-committee specifically to handle fisheries management issues. Sustainability of this arrangement must be given due consideration. Issues to consider may include the possibility of charging of user fees (royalty) to the fishing groups to be granted the rights to fish in reservoirs. The proceeds would be used to finance public good activities, re-stocking dams and some of the fisheries management costs. Some of the costs of reservoir fisheries management will be integrated in the normal MMR operations (work plans and budgets); this is one of the sustainability elements of this intervention.

19. An ecosystem approach will be adopted for inland reservoirs and their catchments to ensure sustainability of the interventions. To mitigate potential risks of siltation, which could endanger the reservoir sustainability, catchment protection measures with sound ecosystem-based watershed management plans conferring resilience on the landscape will be implemented based on experience from the CLMP and the National Agricultural Project (NAP) under the Ministry of Agriculture (MoA). For example, there will be a mixture of hillside afforestation, grazing land enclosure with associated 'cut and carry' systems of fodder for stall-fed livestock and various systems of terracing and contour grass strip barriers to reduce soil erosion (and sediment delivered to the reservoirs). In this way, production systems will be "climate proofed". A careful pre-selection of reservoirs for inland fisheries will be done on the basis of catchments with conservation measures already in place. An inventory of the existing water reservoirs is presented in Appendix 15 (Table 1 & Table 2), providing information on their area, water carrying capacity, fish stock status and production potential. However, there will be need to validate this data and provide additional information especially on their catchment conservation and production status, human and livestock populations. FReMP will start with 6 water reservoirs which have been selected based on current information; Adi-Shaka, and Toker in Zoba Maakel; Bdho, Diga Harnet and Sememo in Zoba Debub. Planning of activities will be done in a participatory, bottom-up manner through user groups, facilitated by the MoA at Zoba and lower administrative levels.

20. *Implement a System for Utilization of Reservoir Fisheries* – To realize the key outcomes of inland fisheries development, FReMP will support a community-driven process to define the rules and regulations for utilizing reservoir fisheries. This process will also identify direct user groups who will carry out fishing and fish processing/marketing activities, following business principles. Fishing enterprise groups and fish processing/marketing enterprise groups will be formed at each reservoir, the former who will mainly be youth while the latter will be dominated by women. The community will decide on the rules and rights of accessing the fisheries resources.

21. *Enhance a System for the Production of Fish Seed (Fingerlings) and Restocking Water Reservoirs* – FReMP will support restocking of the reservoirs under the Programme, the frequency and quantities of stocking to be based on catch assessment data and information and the procedure will be expounded in the management plan. In order to produce enough fish fingerlings for restocking reservoirs, FReMP will support the establishment and operations of a hatchery, in Mai-Sirwa Aquaculture Research Centre, targeting a production capacity of 1.5 million fingerlings per year, especially of tilapia and catfish. Efforts will be made to involve the fishing groups in restocking activities as a way to sensitize them on fish conservation and ensure their ownership of the Programme initiatives.

22. *Pilot Aquaculture Technologies* – FReMP will pilot aquaculture technologies for increased productivity of fisheries resources. These will be implemented in a few reservoirs in order to produce models, lessons and knowledge that can be scaled up in other water reservoirs. The pilots will be set up when the local communities have been sufficiently sensitized and there is increased demand for freshwater fisheries to justify new investments in aquaculture. The choice of aquaculture species may be influenced by several factors. In view of water limited conditions, they should be tolerant to large temperature fluctuations, low to moderate oxygen content and be relatively fast growing with short production cycle (6 - 8 months to attain market size). Availability of fingerlings in the right quantity and quality, skills in production technology, market value and local consumer preferences are also important considerations. Tilapia, carp fish and cat fish are all suitable fish species in water-limited

aquaculture condition, their culture technology is well understood and they can be cultured in ponds, tanks or in cages.

23. FReMP will pilot two of these aquaculture production technologies. The pilots will be subject to management plans and feasibility studies, including screening for environmental and social risks and where necessary impact assessments will be carried out by MMR in collaboration with the Department of Environment.

24. The Programme will pilot cage culture technologies in two reservoirs, which must be carefully selected in terms of adequate depth to support cages, suitable water quality characteristics and high production potential. Cage culture will require dams dedicated entirely for irrigation and where there is no envisaged use for human or animal consumption. There will be need to monitor the water quality parameters to ensure the conditions are favourable for fish growth and take measures to mitigate accumulation of nutrients. Secondly, FReMP will pilot aquaculture in grow-out ponds located on the side-line of two selected reservoirs. This will allow the use of aquaculture inputs for fish feeding and pond fertilization so as to enhance fisheries productivity which, otherwise, would not be acceptable to add into dams used for domestic purposes. The aquaculture activity can be integrated with vegetable farming where water from the fish ponds, already rich in nutrients, can be used to irrigate crops downstream. To reduce costs, ponds will be constructed in a way that they can get water from the dam by gravity, integrating them with the existing irrigation schemes. Stocking will be done during the rainy season when there is less demand for water and conditions are favourable for plankton growth. Each pilot site will have up to 5 ponds to test technical viability of different culture options. Fingerlings will be supplied from the Mai Sirwa Research Centre. FReMP will build capacity for formulation and production of low-cost fish feeds using locally available farm ingredients; this is an important initiative since feeds often constitute up to 60 percent of production costs. Successful technologies will be introduced to two community groups for scaling up. The groups will get more intensive training on practical aspects of raising fish, entrepreneurial training and group dynamics and formulation of fish feed from local materials. They will be linked to the CCU for inputs, to Mai Sirwa for fingerlings and to processing/marketing groups to sell fish. MMR Zoba branches and Mai Sirwa will provide technical backstopping to the groups as needed.

25. ***Subcomponent 1.3:*** **Market Development and Promotion of Fish Consumption –** This sub-component will support activities under four intervention areas; (i) Market development (ii) establishment of an umbrella cooperative for national distribution and marketing small-pelagic fisheries (iii) promoting consumption of fisheries products to improve nutrition.

26. *Market development* – FReMP will support market surveys to keep in track with the market dynamics and align production activities with increasing demand. Attention will be put on development of marketing strategies for different fish products and technologies introduced by the Programme. Effort will be made to establish market linkages and outlets for each cooperative/enterprise groups in the Programme..The Programme will strengthen the national capacity to develop regulations and standards for food quality and safety with respect to fishery products and support branding and promotion of viable fishery products into the local markets. Additional support will be provided for operationalization of the food quality laboratory which is vital for Eritrean fisheries to access export markets. The Programme has made provision for Technical Assistance input for market development activities, which could be sourced from local institutions such as COMSAT and/or partnerships explored with UN specialized agencies with required technical competencies such as FAO and UNIDO.

27. *Establish an Umbrella Cooperative for National Distribution and Marketing of Small-Pelagic Fisheries* – Apart from the animal feed market, it is recognized that there is, presently, no service provider for the national distribution of the small pelagic fish for human consumption. To fill this gap, the Programme will facilitate the formation of an umbrella cooperative, to be formed by processing cooperative units as members/shareholders. The umbrella cooperative will carry out the commercial distribution and marketing of dried small pelagic fisheries to inland cities/towns across the country. The cooperative should have a business plan for its operations and FReMP will support capacity building to enhance the entrepreneurial skills. The co-operative will be allowed to develop gradually

corresponding to the increased demand for its services in marketing small pelagic fishery, nonetheless it is envisaged that it should be fully functional by the third year of FReMP.

28. *Promote Consumption of Fisheries Products for Improved Nutrition* – This activity will target the traditionally non-fish eating communities, non-fishing communities, households at the dam catchment areas, women and children. Generally, communities that are far away from the sea are not familiar with fishing activities and tend to have poor fish eating habits. Value added products (such as Pickle/fermented fish products, fish powder, protein concentrates, fish oil, fish-based snacks, etc.) will be promoted for consumption at households, in hospitals for malnourished children and schools. Fish consumption will be promoted through the existing multi-sectoral approach for community-based interventions. MMR staff at Zoba and sub-Zoba levels will collaborate with the Ministry of Health (nutrition community volunteers), Ministry of Agriculture (extension workers, home economics experts and home agents), the National Union of Eritrean Women (NUEW) and National Union of Eritrean Youth and Students. In an effort to leverage resources and build synergies in addressing the underlying causes of malnutrition, this activity will explore partnership with other development partners, such as FAO, United Nations Children's Emergency Fund (UNICEF) on nutrition/health messaging, water, sanitation and hygiene (WASH) and behaviour change communication. The Government of Eritrea recognizes communication as a comprehensive action with broad stakeholder participation and multiple channel of information dissemination. Promotion activities will be implemented through three stages: a) awareness campaigns; b) development and promotion of recipes; and c) sustainable dietary intake.

29. *Awareness Campaign* will aim at sensitization, behaviour change communication to create awareness, educate and inform on the important nutritional quality of fish with emphasis on the small pelagic fish consumption. The channels for promotion will include radio/TV programmes, drama, social marketing, newsletter, magazines, songs in local languages and the gender tool on household methodologies. *Recipe Development* aims to increase dietary diversity and availability of varied nutritious products. New improved recipes will be developed by enriching locally available staples, such as the Eritrean cuisine *tsebhi* (stew), *Njera/taita* (flatbread made from teff, wheat, or sorghum), and *hilbet* (paste made from legumes; mainly lentil and faba beans). In collaboration with FAO, Ministry of Health, MoA's Home Economics Unit and Nutrition, the existing recipe book will be updated and households will be trained on new developed recipes. The recipes will be published in forms of leaflets and booklets with translation in different local languages. Food demonstration using the new recipes will be conducted by extension workers at community levels. *Sustainable Dietary Intake* aims at influencing regular availability of fish for sustainable food security. At household level, the activities on fish promotion, behaviour change communication and nutrition education will be implemented using the household methodology approach. This approach will explore gender issues to accelerate uptake of nutrition information and improve eating habits for sustainable adequate family diet. The household methodology will engage entire household members – males, females, children, adults and the elderly to ensure common understanding of the nutrition message/education and compliance for adequate dietary intake. The household methodology tool will build on the existing model for campaigning and awareness creation adopted by the Home Economics Unit of the Agriculture Extension Department. With support from the Home Economics Experts, the home agents and extension workers at the grassroots will reach out to the households through the early innovators. These early innovators could be male or female leaders in the communities. In addition, Nutrition Education Modules will be integrated in the training plans of the Hirgigo Fisheries Training Centre and Inland fisheries Research Centre in Mai-Serwa. These two training Centres will strengthen the capacity of extension workers and other implementers in conveying nutrition messages.

30. **Component 2: Fisheries Enterprises Support Services (USD 9.3 Million) –** This component seeks to achieve two objectives: a) promote the development and capacity building of cooperatives and other enterprise groups; and b) strengthen the input provision services to ensure that the legally constituted cooperatives and enterprise groups have access to the requisite inputs to undertake economically viable and sustainable fish-related businesses. The experience generated under the FDP will be used to guide activities foreseen under the different interventions. These objectives are to be achieved through a set of two subcomponents.

31. ***Subcomponent 2.1: Entrepreneurial Capacity Development –*** The subcomponent will focus on mobilisation and facilitate the organisation of different stakeholders at different links of the fisheries

production and marketingprocess (production/fishing, net making and mending, engine repair, drying, processing, marketing, etc.) with the objective of making them ready to effectively access and use the input provision services by the Cooperative Credit Unit (CCU). A total of over 4,200 households are expected to benefit from capacity development comprising fishing cooperatives for small pelagic fish, fish processing/marketing cooperatives and enterprise groups, additional cooperatives for the large fish, fish retailing cooperatives, cooperatives for foot fishers, entrepreneurs for boat/engine repair, women co-operatives for net making/mending, and fishing enterprise groups around the target dams. In order for the organised groups/cooperatives to be linked to/and benefit from the services of the CCU, they must be legally registered. The Programme will adopt a stepwise approach successfully employed under FDP for formation of viable and sustainable cooperatives, which is to be achieved through the following activities: a) Awareness creation about the advantages of belonging to a group/cooperative that encourages and works towards the attainment of agreed objectives; b) Facilitate the formation and registration of new groups/cooperatives; c) Capacity build the groups/cooperatives in technical aspects, entrepreneurship and group dynamics; d) Link the groups/cooperatives with a financing mechanism to access inputs; and e) Link the groups/cooperatives to a potential market for their products. The objective will be to promote viable entities owned and managed by members. FReMP will provide technical assistance and training for such development. For the purpose of manageability of the different groups/cooperatives, efforts will be made to ensure that membership is not more than 15 members which is considered to be an optimum size for running a viable enterprise/cooperative. Particular focus will be given to youth, women and foot fishers.

32. ***Subcomponent 2.2: Strengthen Input Supply Services –*** This subcomponent will focus on consolidating the revolving assets financing system, already established and operational under the FDP, for the sustainable supply of inputs needed by the small-scale stakeholders at the different links of the fisheries production and market linkages. However, the CCU will be transformed into the Cooperative Support Unit (CSU). One of the key differences between the CCU (under FDP) and the CSU (under FReMP) is the fact that the CSU, in addition to providing the asset financing services, will also provide management support services to cooperatives. One of the functions that were not undertaken by the CCU, under FDP, was the transformation into an autonomous (or semi-autonomous) entity. This is an area that FReMP will put particular emphasis on and support the gradual formation of a viable management structure.

33. The subcomponent will also broaden the coverage of the financing system from focusing only on small-scale fishers to include other qualifying stakeholders along the fisheries supply chain. Coverage of the CSU will be broadened to be national in scope and include all activities related to the sustainable undertaking of small pelagic and inland fisheries enterprises (such as fishing, drying, processing, marketing, etc.). All groups/cooperatives supported under Subcomponent 2.1 will be linked to the CSU to access the requisite inputs to commence operations. This will necessarily require CSU representation in all six Zobas (establishment of CSU branches in four inland Zobas in addition to the two coastal Zobas which already have branches). However, given the low level and pilot nature of activities for inland fisheries, the CSU branches in the four inland Zobas will have a light footprint during the first three years of the Programme and will be gradually developed as and when FReMP's inland fisheries' activities unfold to the level that will generate demand for fisheries inputs by the target beneficiaries.

34. The establishment of an autonomous CSU will instrumental for a sustainable provision of assets revolving financing for inputs and management support to individual small-scale fishers or groups. The operational modalities and charter as well as guidelines and procedures for asset financing have been established and disseminated to fishers' cooperative members along the Eritrea Red Sea coastline. The assets financing initiation, vetting, allocation and recovery processes are done in close collaboration with the Government's decentralised systems and concerned cooperatives' management. There is a demonstrated strong interest in accessing fishing inputs, such boat engines and fishing gear accessories, motors, spare parts and ice boxes to support fishing operations.. FReMP will strengthen the CSU's structure and capacity to manage and supervise its operations and, to the extent possible, streamline the collection of repayments to minimise the likelihood for defaulting. Capacity building of the CSU will, among other things, address technical and credit risks and therefore provide safeguards to the operational viability, benefits to fishers and

sustainability of the interventions . An appropriate accounting and administration software will be procured for the CSU to allow for: a) appropriate administration and tracking of outstanding loans and repayments; b) monitor stocks of fishing gears and equipment; and c) produce loan portfolio reports. The FReMP PIM will include a module on the revised CSU operational modalities and charter as well as asset financing guidelines.

35. It should be noted that the CSU will only manage the asset financing system for its members and not cash credit. For all other aspects related to cash credit or micro-insurance, the Programme will link the desiring beneficiaries to alternative sources of micro-finance services, such as the Savings and Micro-Credit Programme (SMCP). That is, all individuals/cooperatives/groups needing cash loans would be facilitated/organised and linked to alternative credit-providing institutions from which they will seek to acquire cash loans.

36. Details related to the CSU in FReMP and alternative sources of micro-finance to the FReMP target group are presented in Annex 1 (Fisheries Input Financing Mechanism) below.

Annex 1: Fisheries Input Financing Mechanism

A. Background

37. The need for the fishers to have access to the inputs they need, under terms that commensurate with the small-scale nature of their businesses, in order to improve their fishing activities has long been established. In 1994, the Ministry of Marine Resources (MMR) established Cooperative Unions with the aim of importing the necessary fishing inputs for eventual distribution to the beneficiaries under agreed loan terms. The main objective of the programme was to promote the Eritrea fishers and the fishing communities by enabling them to improve productivity of artisanal fishing efforts, increase their incomes, enhance their living standards and reduce poverty.

38. While the programme was well-intentioned, it was not founded on solid principles; as such, it was never sustainable. It is reported that the cooperative societies, the eventual beneficiaries of the programme, were not in any way involved in the programme's establishment, operation and control. In addition, the unions were merely loosely organised committees without a legal base. The other factors that contributed to the failure of the endeavour included: a) lack of resources to supervise the credit and collect repayments; b) use of inexperienced staff and lack of business management capacity; and c) failure to address technical and credit risks.

39. The process of the past cooperative development effort and support provided to fishers to increase fish productivity and production generated a number of lessons which were used to inform the design and implementation of the Fisheries Development Project (FDP). Some of such lessons are still relevant today and are being used to inform the design of the Fisheries Resources Management Programme (FReMP). The most relevant of such lessons include:

a) Development approach should be demand driven and not supply pushed;
b) Cooperatives and group development should be voluntary although government can provide education on the formation of such organizations and assure support to enhance the technical and management capability of the organizations;
c) Technical and management training are important and should be given priority attention in group and cooperative development;
d) When cooperatives have large memberships from scattered villages, it makes administration and management difficult in an area with poor communication and transport infrastructure. Cooperative/group size should be reduced to within management capability, with accessibility of members and achievement of the business objectives of the organization as criteria;
e) Apex organizations – Unions and Associations should be developed by societies based on needs and viability of operation;
f) Community elders play a key role in conflict resolution and as opinion shapers, therefore, to the extent possible, their support and advice should be sought in cooperative/group development;
g) Input supply and credit should be administered within a clearly defined system and with due attention to technical and credit risks. Suitable guarantees and collateral for credit must not be ignored.

B. FDP and the CCU

40. Based on past experience, the Cooperative Credit Unit (CCU) was created under the FDP. The objective of this intervention was to ensure that the input financing mechanism in support of the fishers' enterprises is effective and sustainable. It had been foreseen that the CCU, under the FDP, would undertake the following broad functions:

a) Undertake procurement and distribution of fishing input supplies, including boats of different sizes, engines, iceboxes and assorted fishing gears and materials;
b) Sale of fishing inputs on cash or credit basis;

c) Operate a revolving account for revenues generated from input supplies and from operations. This would include the procurement and installation of a loan administration software to monitor and report on the CCU operations in terms of outstanding loans and inventories;
d) Operationalise the six Sub-Centres situated at landing sites along the coast (Gellalo, Tio, Eddi, Barasole, Dahlak and Haliday);
e) Provide management capacity building and other accounting support services to fishers cooperatives;
f) Manage the assets of CCU, and prepare CCU to transform into an autonomous (or semi-autonomous) entity within four years of operation.

41. While FDP has enabled the CCU to undertake some of the functions, as foreseen at the time of designing the Project, other functions are yet to be realised. The CCU management structures have been put in place. The key staff at the CCU Headquarters (in Massawa) are in-post – General Manager, Operations Manager/Accountant, Cashier and Store Keeper. The CCU Management has been provided with capacity building (skills and equipment) to enable them to undertake their responsibilities effectively. The CCU Charter and operational modalities are in place and have been translated into the appropriate languages for the target group. The two bank accounts, one for CCU daily operations for meeting the running costs of the CCU and the second account to handle loan disbursement and repayments for credit management (revolving fund account), were opened and are operational. Different types of inputs (fishing gears and boat (Outboard and Inboard) engines of different capacities) required by the FDP target fishers were procured and are being effectively delivered to qualifying beneficiaries, on a credit basis; the process is following established procedures. Before the inputs are distributed to the two Zobas, they are priced, taking into consideration all the costs incurred, such as the CIF cost, custom duties, transportation and mark-ups. After the pricing exercise, the inputs get distributed to both Northern and Southern Red Sea Zobas in accordance to the number of fishermen and number of type of boats available in each Zoba. Other factors considered include conditions of the fishing grounds in the different environments.

42. Currently, based on past experience, the National Project Coordination Office (NPCO) undertakes procurement of the different inputs which are procured using the services of the NPCO procurement unit. The CCU is progressively building-up the procurement packages for input supply based on requests from fishers' cooperatives, groups and other fishers reflecting their needs and requirements detailed in business plans. The packages will be procured using the services of the MMR procurement unit. The two warehouses (in Massawa and Assab) and the six Sub-Centres (when fully operationalised) will be the centres of sales/distribution.

C. FReMP and the CSU

43. The FDP experience has shown that fishers require a wide range of financial services to meet the liquidity-related needs that arise as a consequence of the seasonal pattern of their expenses and revenues. They also need financial services, such as micro-insurance, that allow them to manage risk and uncertainty that help them to invest in economic activities to increase their incomes. To that effect, the design team, together with the relevant staff of the MMR, deliberated on the CCU implementation modalities under FDP and any changes/modifications that would need to be undertaken to ensure efficiency, effectiveness and sustainability of the input financing mechanism during FReMP implementation and beyond. Building on lessons and experiences of FDP, the team and MMR agreed on the structure, scope and operational modalities for the input financing mechanism under FReMP. FDP has, primarily, sought to address issues specifically related to asset financing or a lease to own arrangement. The same focus will be maintained by FReMP. However, the CCU will be transformed into the Cooperative Support Unit (CSU). One of the key differences between the CCU (under FDP) and the CSU (under FReMP) is the fact that the CSU, in addition to providing the asset financing services, will also provide management support services to cooperatives. One of the functions that were not undertaken by the CCU, under FDP, was the transformation into an autonomous (or semi-autonomous) entity. This is an area that FReMP will put particular emphasis on and support the gradual formation of a viable management structure, which will provide overall supervision and control of its operations.

44. The CSU will provide day to day support for the development and operation of cooperatives, including organization and supervision of training, operation of input supply along with the management of the fisheries input supply revolving account. It will also promote marketing activities of the cooperatives and backstop the financial management of cooperative societies, including ensuring prompt repayment for inputs which may be provided to them on credit. Based on the reports from the societies, the unit will submit to the NPCO, monthly, quarterly, bi-annual and annual reports on the functioning of cooperatives including their production, financial status and the operation of input supply and the revolving account. When the CSU becomes autonomous, its operational costs will be fully paid through earnings from provision of input supply and other services.

45. In summary, the following will guide transition from the FDP CCU to the FReMP CSU:

a) the CSU will use the Charter and Operational Modalities developed under FDP but they will be modified/updated as may be considered necessary to conform to current circumstances;
b) the CSU will have a national Headquarters based in Massawa and Zoba branches in the different six Zobas. Branches in the Zoba Northern Red Sea and Zoba Southern Red Sea are in existence already but may be strengthened, as necessary, to cope with increased demand. Given the low level and pilot nature of activities for inland fisheries, the CSU branches in the four inland Zobas will have a light footprint during the first three years of the Programme and will be gradually developed as and when FReMP's inland fisheries' activities unfold to the level that will generate demand for fisheries inputs by the target beneficiaries;
c) CSU will continue to work with MMR (at the national and Zoba levels) in a manner that encourages the autonomy of the institution (CSU). It is expected that the CSU will become autonomous during the course of FReMP implementation;
d) an autonomous CSU will exclusively manage the input supply system, including managing input stores, receiving, vetting and approve applications for input financing in close collaboration with the MMR Zoba branches and local administration and cooperative representatives. It will manage input distribution and manage the revolving fund. The CSU has already benefited from FDP support in setting up a sound financial management system but will be supported further by FReMP to consolidate the gains made;
e) the CSU will only manage the asset financing system in a sustainable manner for its members and not cash credit. All other aspects related to cash credit or micro-insurance, the Programme will link the desiring beneficiaries to alternative sources of micro-finance services, such as the Savings and Micro-Credit Programme (SMCP). That is, all individuals/cooperatives/groups needing cash loans would be facilitated/organised and linked to alternative credit-providing institutions from which they will seek to acquire cash loans;
f) FReMP will work towards ensuring that the CSU gradually becomes an autonomous member-driven organization. As such it will be receiving decreasing support from FReMP for its operational costs. The aim is for it to be fully autonomous by PY 6 in all aspects and fully owned by its members to whom the management will be answerable.

D. Complementary Source of Micro-Finance

46. The CSU will not be giving out cash credit to its members; its focus will remain exclusively on asset financing. This is largely because it does not have the capacity to handle the implied transactions. This will be left to the appropriate institutions to handle. To that effect, FReMP will work with the Savings and Micro-Credit Programme (SMCP); a Micro-Finance Institution (MFI) operating in the country.

47. SMCP has been operating since 1996 offering MFI services and has a nation-wide coverage. Its core objective is to promote the private sector in Eritrea by encouraging the development and expansion of micro and small-enterprises: a) assisting individuals to increase their income generating ability; and b) helping them contribute their part in the food security and overall economic development of Eritrea.

48. The Programme will facilitate the organisation and capacity building of the target groups (Subcomponent 2.1: Entrepreneurial Capacity Development). Those needing access to fisheries inputs to improve their fishing activities will be linked to the CSU to commence the application process

for the input financing. Those needing access to cash financing will be linked to SMCP to initiate the application and vetting process.

49. Fortunately, the SMCP's target group is not dissimilar to that of FReMP. SMCP targets the economically active poor who have no access to formal financial services. It, however, makes an effort to accommodate the vulnerable strata, including returnees, deportees, demobilised soldiers, vulnerable women groups, and women-headed households.

50. It is highly probable that the FReMP target group will find their 'fit' from the various products provided by SMCP'; it provides five different types of loan products grouped into three different categories:

a) *Group Loan* – Under this category, potential clients become organised by joining the SMCP-sponsored solidarity groups; these groups eventually serve as loan guarantee and, therefore, there is no need for collateral. The loans range from ERN 6,000 to ERN 20,000 and these are spread out into five different loan cycles. There are two different types of Group Loans:
    - Micro-Business Loans;
    - Small Seasonal Agricultural Loans;
b) *Individual Loans* – These loans are meant for individuals engaged in any profitable productive activities and can make the loan repayments. People in rural, semi-urban and small towns who agree to comply with the requirements of the terms of credit are eligible to apply for the loans. The loans range from ERN 30,000 to ERN 150,000 and these are spread out into eight different loan cycles. . There are two different types of Group Loans:
    - Micro-Business Loans;
    - Small Seasonal Agricultural Loans;
c) Unrestricted Employee/Instant Loans – These are salaried loans meant for government or private sector employees with regular salaries. They are unrestricted with regard to the use of the borrowed money. Repayment is on a monthly basis from the borrower's salary. Maximum loan size is equivalent to the borrower's six months' salary but should not exceed ERN 20,000. The loan term is a maximum of two years.

51. As far as interest rates are concerned, SMCP charges 16% per annum for both Group and Individual Loan categories; it applies the declining balance method. Because of the declining balance methodology, the actual interest paid by clients that pay their loan instalments regularly does not exceed 10%. For the Unrestricted Employee/Instant Loan, SMCP charges 7% per annum on a flat-rate calculation basis. However the FReMP target groups are unlikely to benefit from this credit window as they are informal workers.

52. Hence, given SMCP's long term experience, nationwide coverage and a variety of different loan products, FReMP will collaborate with the MFI so as to link as many of its target beneficiaries as possible. The linkage will enable beneficiaries to access the reasonably priced loans, mostly the Group Loand and Individual Loans, to be used variously to improve the economic performance of their different fisheries-related businesses.

Appendix 5: Institutional aspects and implementation arrangements

A. Institutional Framework

1. **The Ministry of Marine Resources (MMR)** – The MMR has overall responsibility for the management and development of the fisheries resources of Eritrea within the legal framework provided by the Fisheries Proclamation (No.104/1998). The Ministry has two operational departments: the Marine Resources Development Department and Marine Resources Regulatory Services Department. The operations of the ministry are decentralized into six Zoba branches. **The Marine Resource Development Department** (MRDD) has three divisions: a) the Artisanal Fisheries Development Division which provides fisheries extension services to small-scale fishers including small-scale fishers' cooperatives; b) the Programme Analysis and Infrastructure Development Division which provides support in construction, maintenance and supervision of fish landing facilities, undertakes programme analysis, sector planning, and programme implementation services; and c) the Inland Fisheries Development Division which provides support for aquaculture production. **The Marine Resources Regulatory Services Department** (MRRSD) has three Divisions: a) the Marine and Coastal Management Division which is responsible for research in marine resources management, data collection and management, and environmental management; b) the Fish Inspection and Quality Control Division which provides quality assurance and certification services including the management of Quality Control Laboratory in Massawa, postharvest research and training; and c) the Fish Industry Development Division which is responsible for fleet licensing, promotion of investment in the Fishery sector, and monitoring, surveillance and control.

2. The Human Resources Development Division has the responsibility for upgrading the capacity of staff of the Ministry, through on-the-job training, formal training in local and foreign institutions. It supports the College of Marine Science and Technology in providing practical training in fishing to undergraduates of the college. It also manages the Hirgigo Fisheries Training Centre **(HFTC)** which was established in 1992 for the purpose of providing skill development for the traditional and emerging fishers including women, youths and demobilized soldiers, and upgrading management capacities of MMR staff. HFTC also runs refresher courses for fishers, and staff of MMR and officers of the private sector companies. Training courses include, *inter-alia*, fishing techniques, safety at sea, navigation, boat repairs and maintenance, cooperative development, extension, postharvest management and fish marketing. **Administration and Finance Division** has three units, namely: a) Personnel Administration Unit, which handles staff matters; b) the Finance Unit which handles finance issues including budget development, management and control, procurements and disbursements; and c) General Services Unit which is responsible for general services including facility maintenance, vehicles and equipment management, and stores operation.

3. There are six MMR Zoba Branch Offices which have the responsibilities for the day to day operations of the MMR field activities at Zoba level. Each Zoba branch has a licensing, monitoring and control unit, which issues fishing licenses, control and monitor fishing operations, provide marketing services, and collect fisheries operation data. They receive technical backstopping services from the MRRSD. There are also Fisheries Development Units which provides extension services and support to cooperative development and operations. They receive technical backstopping and supervision from the MRDD. These units operate from the landing sites. The Zoba Northern Red Sea (ZNRS) Branch controls operations of three landing sites namely, Dahlak, Massawa, and Gelalo. The Zoba Southern Red Sea (ZSRS) Branch controls four landing sites namely, Tio, Eddi, Barasole and Assab. The registered fishers and cooperatives are obliged to land their catches at these landing sites, and receive services and supplies from the sites. The landing sites are generally well equipped. The proposed Programme will improve further operational facilities for better services and to handle increased fish production.

4. **College of Marine Science and Technology** – The College of Marine Science and Technology (COMSAT) was established in June 2005 and is under the auspices of the MMR and Ministry of Education (MOE). The COMSAT has the following objectives:

- to produce graduates that will participate in the exploitation, management and conservation of living marine and coastal resources;
- to train seafarers that can serve in the maritime industry as engineers to train technical personnel that can install, maintain and repair engines and cooling equipment; and
- to generate and disseminate knowledge on the marine and maritime resources of the Eritrean coast through research and publications.

5. The college is currently offering four degree and five diploma programmes in four academic departments: Department of Applied Marine and Fisheries Science (AMFIS); Department of Aquaculture (AQUA); Department of Marine Biotechnology (MBT); Department of Marine Engineering (ME).

6. **National Fisheries Corporation (NFC)** – NFC is government owned and undertakes production, processing and marketing of fish through its subsidiaries: a) Beilul Fishing Company undertakes fishing and owns boats. The company sells most of its catch to government fish marketing company, retailers and individuals; b) the Eritrean Marine Products Company (EMPC) is a processing and marketing company operating a processing plant. The company has facilities for processing and marketing; c) the Erifish Processing Plant has processing facilities and currently sells its products in the regional and local markets; d) the Assab Processing Plant which is currently not processing but buys and sells fresh fish in the local markets. The NFC provides inputs, such as ice to fishers on credit in all the landing sites.

7. **Zoba Administration** – Following the government decentralization policy to bring development closer to the citizens, the Zoba Administrations have been established in all six Zobas. The Zoba Administrations are responsible for managing and coordinating planning and implementation of all development programmes at Zoba level. The Zobas are sub-divided to sub-Zobas, which are further divided into Kebabi/villages ─ the lowest administration units in the local government administration structure. The local administrations are under the overall leadership of the Governors, supported by Zoba administrators, Sub-zoba administrators and Kebabi administrators, respectively, for day to day management and supervision of development programmes. The FReMP will involve all the six Zoba Administrations of the GoE.

8. **Artisanal Fishers Cooperatives** – The cooperative system has been accorded legal recognition within Fisheries Proclamation 104/1998 and are registered by the MMR. There are 37 cooperative societies with a membership of about 1200. These societies are provided support basically through provision of inputs and credit. It had been expected that under the Fisheries Development Project (FDP) the existing societies would be restructured and strengthened to enable them operate in accordance with business principles. The envisaged restructuring has not been accomplished, but as a step forward the FDP has established a functional Cooperative Credit Unit (CCU). This is a semi- autonomous government entity under MMR which handles asset financing services for small scale fishers through a revolving fund credit scheme. It is responsible for procurement and distribution of inputs along with the associated revolving account; and management of loan repayment.

9. **Ministry of Land, Water and Environment –** The MLWE is organized into three departments: a) Land Department; b) Water Resources Department; and c) Environment Department. The Land Department has responsibility for allocation of land concessions for agricultural development through its three divisions – National Cadastral Office, Land Use and Cartography Division, and Monitoring and Evaluation Division. The Water Resources Department's mandate includes establishment of the necessary legal and regulatory frameworks for water use, the collection and processing of water related data, and issuance of water permits. The department has two divisions: Water Use Management Division, and Water Resources Assessment Division. The department has a small number of staff at Zoba level, primarily engaged in data collection and analysis of drinking water quality. The Environment Department has the responsibility for ensuring that the development activities are carried out in line with environmental rules and regulations. It is responsible for the implementation of international environmental obligations entered into by the GoE. The Environment Department in collaboration with MMR will ensure that environmental guidelines for sustainable fish production and protection of coastal and marine resources are observed. It will play key roles in the review of policies, strategies and legal framework ensuring response to environmental management issues. It will work closely with MMR in the preparation of Integrated Coastal Area Management Plans

to ensure a coordinated effort in coastal area development for overall environmental protection; and management plans for the utilization of water in the inland reservoirs, including the dams that will be supported under the FReMP.

10. **The Private Sector and NGOs –** Currently there is limited private sector led initiatives in the Eritrean fisheries sector. As mentioned above, major production, processing and marketing operations in the fishery sector, are undertaken by government through MMR and NFC. There are few seasonal licensed foreign fishing companies operating in Eritrean waters in partnership with NFC; and two private boat building companies. There are about 15 registered local fish retailing operators. Small-scale fishers, semi-commercial Eritrean fishing companies and Fishers Cooperatives are therefore developing with the support of GoE and development partners. NGO operations in the fishery sector are also limited. Only two international NGOs, have provided support to the small-scale fishers. An Italian NGO-Institute Sindicale Di Cooperatione Allo Svilupo (ISCOS) has provided support for postharvest handling, processing and marketing of small and medium pelagic fish; market and fish food development. A Danish Society Fora Living Sea (DSFAL) has supported a cooperation with the cooperatives on the principle of fishers to fishers' friendship and cooperation through the "Red sea coastal fisheries development Programme". There two local NGOs that may be involved in the Programme are: a) National Union of Eritrean Women (NUEW); and b) National Union of Eritrean Youth (NUEY). These NGOs have great potential in the development, mobilization and promotion activities for youth and women beneficiaries of FReMP.

B. Institutional Arrangement for Programme Management and Coordination

11. FReMP will be a national Programme that will cover the six Zobas of Eritrea, and will be implemented over a period of seven years. The GOE support will focus on providing necessary operational environment for the development of the fishery sector. Suitable policies and strategies to encourage private sector investment will be promoted; and technical services will be provided to improve the capacity of small-scale fishers. The government will also undertake measures to prevent over-exploitation of marine resources, and protect the coastal environment. The Ministry of Marine Resources will ensure the delivery of public services under the Programme. The programme delivery systems will be integrated into the decentralized organisational and operational structures. This will include structures and mechanisms for Programme leadership, oversight and strategic guidance; coordination and technical backstopping; planning and budgeting. As much as possible, the financial management, Monitoring and Evaluation and procurement for the programme will be aligned with the systems of government consistent with IFAD procedures. The technical staff in MMR and the Zoba administrations, particularly fisheries development division will take a lead role in technical coordination and delivery of FReMP. Relevant Programme implementation entities will be strengthened in terms of technical and institutional capacity to effectively respond to the scope and technical demands of the proposed Programme.

12. IFAD will directly supervise the Programme including provision of implementation support as needed. Two supervision missions will be carried out in each year throughout the implementation period of the programme.

13. The GOE has designated the Ministry of Marine Resources (MMR) as the lead implementing agency, and the Minister of Marine Resources as the overall leader and authorized representative for the GOE. The programme will be implemented within the decentralized institutional framework of the GOE that will involve coordinated planning, implementation and monitoring from the central Government to Local Government administrations (Zora and Sub-Zobas) and fishing communities at Kebabi level, in the coastal and inland areas. The six Zoba administrations will take an increased role in implementation of the programme, including the day to day operation of the field activities with the backstopping of MRDD; and the MRRSD. The training to both MMR and other programme implementing entities will be the responsibility of HRD through its Hirgigo Fisheries Training Centre in collaboration with the COMSAT.

14. The institutional and implementation arrangements for the FReMP will to a large extent be built on the structures and mechanisms of the predecessor Programme, FDP. This will allow seamless transition by bringing into FReMP the lessons, experiences and achievements of the FDP. The various MMR Departments and Divisions, and the zonal branches will provide support in accordance with their respective mandates. The following are mechanisms for programme management, coordination and oversight in the MMR:

15. **Programme Steering Committee (PSC)**: Chaired by the Minister for MMR will assume responsibility for policy and strategic guidance, providing oversight of implementation to ensure that the programme achieves the intended objectives and sectoral goals. The membership will be decided by the Minister of Marine Resources; to include key ministries such as Ministry of Local Government, Ministry of Agriculture and Ministry of Land, Water and Environment MLWE. The committee will meet on a six monthly basis and as needs arises. The committee will be responsible for the following:

- Provide strategic guidance on programme priorities, resource allocation and ensure that the implementation of the Programmes is within the established policies and strategy in the sector;
- Ensure that necessary enabling environment for delivery of the programme is in place, including GOE budgetary provision for implementation;
- Provide general oversight of programme, including resolving implementation constraints and challenges to ensure that expected outcomes are achieved on timely manner;
- Review and approve Annual work plan and Budget (AWPB);
- Review and approve implementation reports including, bi-annual/annual progress reports and monitoring/ evaluation reports,
- Review special studies, and audit reports;
- Maintain contacts with the beneficiaries through at least one field visit per year, to ensure that they receive support from the Programme as planned;
- Facilitate inter-governmental coordination and collaboration among various development partners

16. **Programme Technical Committee (PTC):** This committee will be set up to support the functions of PSC. The Minister of Marine Recourses will set-up the committee and oversee its operation, including appointment of its chairperson and secretary. Its main responsibility is provision of technical support to PSC on policy and strategy issues affecting programme implementation. The PTC will also be responsible for reviewing and synthesizing technical documents for final scrutiny and approval by the PSC. Its membership include representatives of key technical entities in MMR and other implementing agencies, such as: the Directors of the six Zoba administrations, Director Generals of the MMR Departments, and Directors of Divisions of MMR, Head of National Union of Eritrean Women (NUEW), National Union of Eritrean Youths (NUEY), a representative of College of Marine Science and Technology and the Manager of CCU. The minister will appoint its chairman and secretary. The committee will meet on a quarterly basis. The following will be key responsibilities of the PTC:

- Review the AWPB to ensure internal consistency, technical appropriateness, proper alignment with programme design targets and responsiveness to the needs of the beneficiaries;
- Endorse AWPBs with highlights and key recommendations on action expected from PSC;
- Review implementation reports and studies and provide recommendations to PSC on important implementation issues that needs guidance and/or decisions;
- Provide technical advices on technologies promoted under the Programme, with particular attention to resource exploitation, conservation and sustainability;
- Provide technical backstopping to implementation through supervision of programme at least once a year.

17. **National Programme Coordination Office (NPCO)** established under FDP will continue to provide day to day management and supervision of the programme, under leadership of a national programme coordinator, reporting to the MMR Minister. The NPCO will be responsible for overall coordination of Programme activities to enhance harmonization and collaboration. The specific responsibilities will include to:

- Support delivery of programme to beneficiaries by managing and coordinating technical backstopping, capacity building activities, knowledge management, flow of information, tracking programme results and harmonize implementation approaches;
- Coordinate and support procurement of goods, works and services for programme implementing entities;
- Financial management, including disbursement of funds to programme implementing entities;

- Set up a support plan for the Zobas on financial management in order to check the consistency between the progress reports sent by the Zobas and the actual supporting documentations;
- Coordinate and harmonize planning process and consolidate Annual Work Plans and Budgets in collaboration with the Zobas;
- Strengthen partnerships and build synergies with other development partners to ensure that FReMP interventions complement those of other Development Partners;
- Guide programme implementing entities to ensure that the programme is implemented in accordance with agreed approach for delivery each of the programme components;
- Provide advice necessary to facilitate implementation and achievement of intended results;
- Conduct national biannual/annual implementation reviews, stakeholders coordination workshops to strengthen knowledge sharing;
- Review and consolidate bi-annual and annual progress reports and other technical reports for PST review;
- organize and coordinate programme mid-term reviews, impact assessments and programme completion evaluation;
- Serve as the secretariat to PSC.

18. **Zoba Programme Coordination Offices (ZPCOs),** will be introduced in all the six Zoba administrations to strengthen coordination of FReMP under the decentralized structures, and serve as a link with the NPCO and other national and local levels Programme implementation entities. Like the NPCO, these will be government staff designated to the programme for day to day management and coordination of programme implementation in their respective Zobas. The composition of ZPCOs will include Zoba coordinators, M&E officers, and Financial Managers and Procurement officers. Their roles will include, but not limited to:

- Facilitate and coordinate Zoba level planning and budgeting process;
- Consolidate Zoba Annual work plans and budgets, biannual/annual progress reports
- Coordinate Zoba procurement, Financial Management, M&E and Knowledge Coordinate data collection for Monitoring and evaluation and supervision of Programme activities in the Zoba;
- Undertake systematic accounting and provide SoE reports to the NPCO monthly;
- Secure the supporting documentation in a safe place and well in order;
- Facilitate the annual external audit as well as supervision Missions;
- Ensure respect with the internal audit guidelines issued by the Auditor General;
- Ensure fluidity of disbursement through the preparation of the progress reports to be sent to the NPCO;
- Ensure that the Programme is efficiently and effectively delivered to beneficiaries in accordance with agreed programme AWPB, approaches and guidelines;
- Management;
- Ensure that interventions are technically and economically sound and sustainable to deliver the intended results and impacts to beneficiaries;
- Organize Zoba biannual/ annual implementation reviews and stakeholders workshops for knowledge sharing;
- Establish collaboration and partnerships with other development programmes and initiatives implemented in their respective Zobas.

C. Institutions/agencies and partners– Roles in Programme Delivery

19. **MMR Departments** – With the support of NPCO the MMR departments particularly Marine Resources Development Department (MRDD) and Marine Resources Regulatory Services Department (MMRDS) will assume the primary responsibility of technical backstopping, ensure timely and coordinated responses to technical demands from the Zoba administrations. The **MRDD** will be responsible for provision of technical support for effective fishing including improvement of fishing techniques, provision of extension support, effective functioning of infrastructures; timely and adequate supply of inputs particularly ice; and supervision of the operations at the landing sites.. The Director General of MRDD will have direct responsibility for overall supervision and coordination of

these services. The **MMRDS** will be responsible for quality certification, including the direct supervision of quality control laboratory; monitoring, control and surveillance services to avoid over-fishing and ensure the protection of marine environment; supervision of the preparation and implementation of Integrated Coastal Area Management Plan; and maintain necessary data on fish landing and marine resources situation. The MMRDS will ensure that fishing and other maritime operations are carried-out within the National Environmental Management Plan that ensures sustainable resource use. The Director General of the MMRDS will ensure that these responsibilities are effectively carried out.

20. **Ministry of Land, Water and Environment** – through its Land Department, Water Department and Environment Department will address issues related to land use, advise on legal framework for water use, provide water related data especially for inland fisheries, and ensure that FReMP activities are implemented in compliance with environmental rules and regulations, during project implementation. It will work in collaboration with MMR in facilitating development marine resource management plans, and inland water reservoir management plans, particularly the FReMP supported dams for aquiculture development.

21. **Ministry of Local Government** – will ensure that the GOE decentralized structure provides adequate support for implementation of FReMP in all the six Zoba administrations, and their respective Sub-Zobas and Kebabi. This will include integration of the programme into the decentralized systems for planning, implementation, monitoring and evaluation and reporting; and ensure adequate staffing levels.

22. **Zoba Administration** – the FReMP will be managed and coordinated through respective Zoba Administration system. The day-to-day implementation and coordination will be the responsibility of the respective Zoba administration, under the direction of the Governor. The technical capacity of the Zoba Administration will be strengthened in terms of human resources and technical skills to ensure effective delivery of FReMP. The Zoba division of fisheries development will be responsible for technical leadership. **Sub-Zoba Administration**– implementation of project activities will be supported by relevant technical staff under the leadership of the Sub-Zoba administrator. At the **Kebabi administration,** the project will be implemented under the leadership of Kebabi administrator. At community level, the grassroots institutions, such as cooperatives/production and market linkage enterprise groups and various committees, such as watershed management, water resource management and planning committees will be strengthened to play more prominent roles in facilitating and supervision of planning processes and implementation of project activities by beneficiaries/communities.

23. **Cooperative and Credit Unit (CCU)** – through its decentralized set-up in all Zobas it will provide sustainable asset financing services to different categories of project beneficiaries (fishers), through their cooperatives and groups in coastal and inlands zobas. This service will be on credit through the revolving fund established in FDP. It will ensure timely procurement and distribution of inputs and loan recovery to minimize default and ensure sustainability of this financing facility (see subcomponent 2.2).

24. **Grass-root Institutions:** The grass root institutions, such as cooperative societies, enterprise groups and various community based committees, such as watershed management, water resource management, planning committees and others will be strengthened to play more prominent roles in facilitating the planning processes and implementation of project activities by beneficiaries/communities. They will be the entry point for the project interventions, including mobilizing beneficiaries for collective actions related to project implementation.

25. **Development Partners** – The project will maintain collaboration and partnership with other development and technical partners; providing support to inland and marine fisheries in Eritrea, such as UNDP to ensure synergies and knowledge sharing. Opportunities will be explored during FReMP implementation for collaboration with the **National Union of Eritrea Youth (NUEY)** to take part in mobilization of youths for aquaculture and identification of capacity needs and support required to engage them in the implementation of FReMP; and the **National Union of Eritrea Women (NUEW)** to mobilize and support empowerment activities for women beneficiaries.

Appendix 6: Planning, M&E and learning and knowledge management

Background

1. This Appendix provides the main ingredients for further elaboration and fine-tuning of planning, monitoring and evaluation (P/M&E), reporting, learning and knowledge management functions in the PIM. FReMP's approaches for P/M&E, learning and knowledge management will build on the experience of the FDP and the other IFAD Programmes/Projects in Eritrea and will use and improve on tools and templates already developed for data collection, tracking Programme results (outputs and outcomes), physical progress reporting and dissemination of knowledge/information. Proposed modifications and enhancements under the FReMP are justified by the Programme countrywide scope and the nature of proposed interventions. Given the nature of the Programme interventions, most of the implementation will rest with the MMR departments, NPCO, Zobas, service providers and community-based beneficiaries. At Zoba and sub-Zobas levels, the implementation of Programme activities will be well integrated into existing government and institutional systems.

2. P/M&E, learning and knowledge management functions will be embedded in the Institutional Strengthening and Implementation Support component, coordinated by the NPCO. This will be fed into by all implementers at national and Zoba levels and supported by additional professional staff who will work closely with subject-matter specialists to strengthen learning and knowledge management. The M&E system will feed into MMR management information system and IFAD's Results and Impact Management System (RIMS). The objectives of the monitoring and evaluation system set up under the Programme are three-fold: a) to provide information on Programme implementation progress towards the achievement of targeted results for Programme management and decision-making at different levels; b) for accountability vis-à-vis funds disbursed; and c) for learning purposes vis-à-vis options for replication, up-scaling and risk management.

3. Beyond its role in data management and monitoring and measuring of Programme indicators, results and impacts, the system for P/M&E of the Programme will be developed as an integral part of the process of Programme implementation. Among others, its purpose will be to support dialogue and interaction between the various levels of government and actors who are responsible for the governance of public investment and to facilitate participatory learning and ownership of the Programme at the local level. More specifically, the P/M&E system will be designed to: a) provide updated information on the goals, results, effects and impacts of the Programme; b) support the Programme Steering Committees (PSC) and Programme management in making decisions about the strategies, actions, and investment expenses that lead to achievement of the objectives; c) strengthen the interrelationship between the NPCO and the various strategic partners who will be involved in implementation; d) be an instrument for strengthening the capacity of the participating Zobas, sub-Zobas, cooperatives and enterprise groups for participating in and administering and managing local development processes and investments in accordance with current policies and directives; and e) allow the development of spaces for learning, exchange of experiences, good practices and dissemination of results. Thus, the system will also be closely linked to the Programme's broader agenda for knowledge management.

4. A comprehensive M&E and knowledge management plan will be developed as part of the PIM for the Programme as a whole, to be complemented with annual M&E and KM plans and budgets. Particular attention will be paid to knowledge management, learning and dissemination in order to better inform activity planning, serve as a foundation for documentation and replication of Programme successes, provide the analytical basis to resolve challenges, and help to adapt activities to changing social and economic circumstances in the target areas. In this regard, a position of M&E Assistant will be established who will be fully dedicated to Knowledge Management activities. The Programme will explore the likelihood for south-south cooperation opportunities for knowledge sharing and, in this regard, exchange visits are planned.

5. The Programme M&E system will aid tracking and verification of levels of achievement of Programme outputs, the associated outcomes, and the success in achieving the Programme objective and its development goal. These levels are all causally connected as set out in the Programme Logical Framework, which constitutes the structure for the Programme M&E system. To a large

extent, the M&E system will be participatory and thus involve the supported communities in data collection and management. The M&E the Assistant will lead the process of data collection, analysis and management in a standardised system, keep a central system to compile overall monitoring and evaluation information, and organize studies to measure overall impacts.

6. FReMP has an advantage with regard to the development of the P/M&E systems since FDP already has a developed systems. At the same time, experience from the FDP and other IFAD supported Projects/Programmes indicates some areas where adjustments and/or strengthening under the new Programme are desirable. These include: a) strong focus on training in planning skills and tools, especially for collection of information from participatory processes at local-levels, is desirable; b) decentralized and participatory P/M&E processes at Zoba level that require tracking of a significant number of indicators requires effective reporting systems jointly built by NPCO and ZPCOs; c) NPCO M&E staff require advanced training on alternative methodologies (e.g. case studies, intensive interviews, others) and basic training on the livelihoods of rural households in the target areas in order to improve the accuracy of surveys and monitoring; d) the Annual Outcome Survey (AOS) should be conducted on mid-year basis (from May to July) so that the results can be used in the development of the subsequent annual work plan; and e) the AOS cannot capture impacts in a detailed and comprehensive way. If resources allow, it is advisable to complement the AOS with qualitative instruments, targeted to priority themes/issues of the fisheries sector and/or impact assessment studies at MTR and end of Programme.

Baseline.

7. A baseline survey will be undertaken during the first year of the Programme to benchmark the existing situation in FReMP's target areas prior to start up. This will include a food survey for nutrition specific indicators. Given that FReMP is a follow-on Programme to FDP, the baseline will largely benefit from the Project Completion Report (PCR) and Beneficiaries Impact Assessment (BIA) of FDP for coastal activities. For new activities (small pelagic and inland fisheries), the baseline will build on the small pelagic fish stock assessment and production and market linkage analysis undertaken during the design, as well as the inland fisheries analysis to be conducted by FDP. The baseline survey will include context-specific needs assessments of the concrete barriers to smallholder-driven fisheries sector development in the different target Zobas and sub-Zobas and address information needs for implementation and planning.

8. The baseline data and system for tracking Programme outcome indicators and reporting format will be improved, building on the work done in the context of the joint FAO/IFAD Initiative on Capacity Development for better Management of Public Investments in small-scale agriculture in developing countries. It has been established that there is dearth of data on fish consumption and food practices in the various communities in coastal and inland Zobas. MMR will be supported to conduct a food survey and generate information that will complement national data on the fish consumption pattern in Eritrea. Good practices and lessons learned will be disseminated through factsheets, technical reports, publications, meetings and workshops with stakeholders at national and regional levels. The NPCO and ZPCOs will conduct annual AWPB review meetings, annual outcome surveys and biannual implementation progress reviews.

Planning and Monitoring & Evaluation

9. The Planning and Monitoring & Evaluation system will consist of the following subsystems: a) the linked Annual Work Program & Budget (AWPB), which uses as inputs the Logical/Result framework, operational plans, participatory assessments and plans for the development of participating communities and organizations, and the Programme's exit strategy/plans for sustaining advances and outcomes after closing; b) the monitoring subsystem (including information management system, including data collection, analysis, flow from one level to another and data management) for indicators, which will manage periodic reports, reports of field visits, progress reports, monthly meetings of the different Programme implementation units, specific reports and information generated during supervision missions, and joint reviews of IFAD and the Government; c) the evaluation subsystem, which will be based on the baseline study and impact indicators, internal and/or external evaluation reports and studies on Programme outcomes and impacts, and the Programme completion report; and, d) the learning subsystem, consisting of a systematic process oriented towards collective reflection by the Programme actors on the experiences during the

implementation of the Programme in order to refine Programme methodologies and approaches, exchange learning and knowledge, and generate new knowledge.

Result/Logical Framework.

10. A principal guide for the implementation and monitoring of the Programme will be the result/logical framework. The result/logical framework will be refined during the first year of implementation (2017), as part of the Programme initiation activities. This will serve both to better ground the logical framework within the local context as well as to promote ownership by the Programme team. In addition, the result/logical framework, including indicators and their respective targets will be reviewed thoroughly during the midterm evaluation of the Programme and, if necessary, as part of the adaptive learning process based on the monitoring of the Programme's implementation. The objective of having an on-going review of the result/logical framework is to encourage its use as a tool for Programme management. Also the use of the result/logical framework should assist the Programme team to work more coherently towards the same goals and structure of results and impacts, while providing Programme management with a tool for ensuring Programme's alignment with the strategic priorities for poverty reduction embodied in design and in accordance with national policies, strategies and plans.

Planning

11. The Programme will adopt a bottom-up community-driven planning process, in alignment with the GoE's decentralised participatory planning system tailored to local needs and community priorities. Each Kebabi administration will be responsible for leading the annual planning process with the beneficiary communities. The community plans will be consolidate into Kebabi annual plans which will then be consolidated into sub-Zoba plans, and finally into Zoba plans by the ZPCOs. The NPCO will receive, review, harmonise and consolidate the AWPBs from the six Zobas and all other cost centres. A standard AWPB template will be included in the PIM to maintain coherence among all Programme implementing entities. Annual AWPB review meetings will be conducted during the planning cycle at Zoba and national levels to bring together all Programme implementing entities to jointly review the AWPB before it is finalized to allow common understanding of annual priorities and expected targets.

12. AWPBs will provide the NPCO with a timetable for implementation of a set of carefully scheduled activities with specific annual targets, together with their budgets and input requirements for the coming year. AWPBs will be formulated taking into account the implementation progress and lessons from previous AWPB, the Programme design report, supervision and implementation support report recommendations and legal covenants, such as contracts and partnership agreements of service providers and participating partners, and their expected absorption capacity. Annual Work Plan and Budget allocations constitute a basis for release of funds and for financial control. Coordination, with various actors and partnerships, will be pursued where feasible leading to synergy and added value. Proactively exploring opportunities for linkages will be one of the important tasks for the NPCO, which will also contribute to coordinating the support for the fisheries sector under the FReMP. The Programme will work very closely with other IFAD and GoE's other partners financed Programmes/Projects to maximise intended benefits within the spirit of ecosystem, watershed and coastal management approach as well as to increase smallholder access to inputs, investment support and services. Memoranda of Understanding will be signed to help guide collaboration with other partners.

13. Failure to prepare the AWPB on a timely basis may lead to delay in or suspension of disbursements by IFAD. The procurement plan for the first 24 month[39] of the Programme will be prepared as part of the final design and form the basis of the first annual work plan, which will be presented for discussion during the FReMP start-up workshop, as well as for submission to IFAD for review and no objection.

Subsequent AWPBs will be submitted to the PSC for its review and approval. The approved draft AWPB will then be transmitted to IFAD for comments and no objection no later than sixty days before the beginning of the relevant Programme year. An Annual Stakeholder Review and Planning

[39] The procurement plan has been made for 24 months to allow for the use of multi-year framework procurement contracts for fisheries inputs and other recurrent good and services as already successfully implemented under FDP.

Workshop at which Annual Performance Report findings and management implications will be discussed will support the AWPB preparation process. If required, the NPCO, through the PSC, can propose adjustments in the AWPB during the Programme year, which will become effective after clearance by IFAD.

14. In the first year, the NPCO will also provide and coordinate training workshops on the Programme strategy and approaches, gender awareness, the AWPB, and procurement for key stakeholders. This will ensure an accurate and shared understanding of the Programme strategy and information needs.

Monitoring and evaluation

15. The M&E system will monitor programme performance and assess the impact of the Programme activities. Monitoring will focus on activities/inputs, outputs, outcomes, performance and risks while evaluation will assess the relevance, efficiency, effectiveness and impact on poverty reduction, income, nutrition, production, productivity, empowerment and partnership, sustainability, replicability, lessons learned, and knowledge up-take brought about by FReMP. The M&E system will cover both the operational and financial aspects of the Programme.

16. The Programme M&E system will be complemented with: a) a baseline survey; b) annual joint supervision missions by IFAD and MMR (every six months on average); c) annual Programme output/outcome surveys; d) an annual Programme audit; e) a comprehensive Mid-Term Review (MTR); and f) a Programme Completion Report (PCR) which will be informed by a Beneficiary Impact Assessment (BIA). In addition, ad hoc thematic/diagnostic studies will be undertaken as and when necessary.

17. The M&E system will build and learn from existing systems in on-going IFAD supported Programmes/Projects in Eritrea, particularly from FDP and will be based on the Logical/Result Framework and generate verifiable information on the Programme's performance to assist the MMR, NPCO, Zobas, other implementers and service providers to plan and implement their activities, compare progress against targets and allow timely remedial action to correct problems. Information generated will contribute to facilitating workflows and improving the quality of decision-making. It is, therefore, important to provide a clear common framework for planning and progress reporting, and to ensure that all parties have clear understanding of the tools, formats, definition and applicability of indicators, and are ready and able to meet quality assurance requirements.

18. To a considerable extent, the M&E system will be participatory, involving the supported communities in data collection and management, gender sensitive and results-oriented while enabling the integration of physical and financial progress reporting. In addition, the system will enable the analysis of climate risk and environmental footprint. The system will incorporate in-depth baseline and completion surveys, a Mid-Term Review (MTR) and other thematic studies as relevant including qualitative studies.

19. ***Monitoring –*** The monitoring will provide semi-annual and annual feedback on the extent to which the Programme is achieving its outputs, implementing the activities, identifying potential problems at an early stage and proposing possible solutions. The accessibility of the Programme to all sectors of the target population, as well as the technical and financial efficiency will be monitored and possible improvements suggested. Monitoring indicators have been selected for each of the Programme's outcomes as detailed in the Logical/Result Framework. Wherever relevant and possible, gender-specific and poverty data will be collected.

20. Beneficiary participation in Programme monitoring will be ensured by involving the target groups, with special effort made to include women and youth by organizing the interviews at suitable times and venue and applying appropriate interview techniques. Monitoring will include data collection in forms of individual interviews, focus group discussion, case studies or applied research.

21. The Programme will use one tool suitable for baseline, mid-term and end of Programme surveys which is the Women's Empowerment in Agriculture Index (WEAI). It is currently being piloted in several IFAD-supported initiatives to track Programme impact on women's empowerment in five key domains of production, resources, income, leadership and time use.

22. Programme training will be monitored to track their impacts on beneficiaries through a competency based assessment. This will include pre and post training knowledge tests with a further

test 6-12 months post training to determine knowledge retention and adoption. It will not be possible to monitor all training events at this level; however, random competency monitoring will be applied to all typologies of training events across the Programme life. Competency test results will be gender disaggregated.

23. ***Evaluation***: Programme evaluation will be initiated and managed by the NPCO in two major forms: a) annual outcome/impact evaluation; and b) thematic evaluation. At the same time, full reviews at mid-term and at the conclusion of the Programme will be conducted by IFAD and GoE. These two official reviews are the MTR and PCR.

24. ***Impact evaluation:*** The impact will be measured based on comparison of the baseline data, with achievements of targets at mid-term and at Programme end. The *Baseline Survey* will be undertaken shortly after Programme start-up to provide a platform of information from which the follow-on surveys could reveal changes in the households' livelihoods. Similarly, *the Mid-term Survey* and the *Completion Survey* (Beneficiary Impact Assessment to feed into the Programme Completion Report) will be carried out just before the MTR and towards the end of the Programme, respectively, timed so that that their results will be available for the MTR and PCR. These follow-on surveys will be carried out in the same manner as the Baseline Survey. Ideally they will visit the same GPS-identified households so that developments in the course of Programme participation can be measured, and household members who have left the Programme area as a result of finding employment elsewhere will be captured as well. These three surveys will be carried out in conformity with IFAD's Results and Impact Management System (RIMS) reporting requirements. They will use the standard RIMS questionnaire form to collect key beneficiary data including household assets and base data used to establish the prevalence of child malnutrition in participating households, with a few added questions to reflect.

25. ***Programme-specific/thematic impact study*.** In accordance with IFAD SKD standard methodology for impact assessments to be used for all IFAD Projects/Programmes, the participating households will be randomly selected from the Programme districts. The data will be processed by a simple custom software package to be provided by IFAD. The RIMS methodology will be modified to ensure capture of the degree of impact in terms of the flow-on effects (knowledge and transfer of technology) of Programme activities to households not directly impacted by the Programme; and the impact of changes in the external environment (macroeconomic changes) that would impact on all households. Therefore, the NPCO will contract or carry out thematic impact studies that will look at the impact of activities under Programme Outcomes. Such impact assessment will include, *inter alia,* an analysis of male and female farmer knowledge of and attitudes to key main Programme interventions' topic. The topics for these thematic studies will be identified in consultation with relevant MMR departments and Zobas during Programme implementation. The Monitoring Framework provides the indicators, collection methods and the usage of the processed data.

26. ***Mid-term Review and Completion Review*:** IFAD and GoE will be responsible for carrying out two full reviews of the Programme achievements: the MTR early in Programme Year 4 and the completion review after Programme completion. Key questions to be answered during the reviews on the basis of the indicators contained in the Logical/Result Framework will include: a) have Programme investments contributed to development of viable fisheries enterprises and their access to the requisite inputs on a sustainable basis; b) have Programme investments contributed to increase fish production and incomes for small-scale fishers, fish processors and traders on a sustainable basis; c) have Programme investments contributed to raising the fisheries production and productivity, delivering of increased volumes of fish to consumers and their consumption, enabled poor households particularly small-scale fishers, fish processors and traders to improve their income and resilience on a sustainable basis; d) has the Programme targeting mechanism been successful; e) has the Programme contributed good examples to the national policies related to fisheries resources management and smallholder poverty alleviation; and f) how have changes in the external environment impacted on Programme beneficiaries.

Progress Reporting

27. Results and learning-oriented progress reporting will be based on inputs from beneficiaries and implementing partners using appropriate technologies such as electronic hand-held data collection devices feeding directly into the Programme management information system. Monitoring results will

be part of the six monthly progress reports and assessment/evaluations of the FReMP will be an essential element of all reviews.

28. The NPCO will be responsible for the preparation of a consolidated six-monthly and annual Programme progress reports for submission to the PSC and IFAD within a month from the end of the reporting period. ZPCO, implementing agencies and service providers will be required to provide their progress reports as an input for the NPCO to prepare the Programme report that will be submitted to IFAD and Government in a timely and accurate manner. This report will include the narrative report as a harmonised source of key data and ensure the trends are highlighted. The reports will record the financial and physical progress against AWPB targets. The NPCO will prepare a report on knowledge management and analytical work, with a tabular appendix showing the progress against the Programme indicators. The NPCO will be responsible only for the availability of data as indicated in the Logical/Result Framework. The availability of all other data in the appendix will be the responsibility of the institutions, assisted by the NPCO in the preparation of the standardised reporting formats.

29. The MMR supported departments, ZPCO, implementing agencies and service providers will - within 2 weeks from the end of the reporting period - submit six-monthly result-based progress reports to the NPCO as a condition for release of funds for the ensuing period. ZPCO will be accountable and report to the NPCO and on Programme supported field initiatives.

30. ***Annual Results and Impact Reporting*:** The NPCO reporting system on the Programme indicators will overlap with IFAD's RIMS. The information to be included in these Annual Results and Impact Reports will largely follow the format of the FDP and other IFAD supported Projects/Programmes. It will be related to the targets contained in the Programme Appraisal Report and those in the AWPBs.

31. ***Mid-Term Report*:** This report will be prepared by the NPCO and comprise the assessment of the efficiency as well as the Programme achievements to-date, an analysis of the Programme approach and activities, and detailed proposals for the implementation of the second phase of FReMP.

32. ***Programme Performance Assessment***: At the end of the implementation period, a comprehensive PCR will be compiled by the NPCO. The assessment criteria will include: participation of the target groups, the Programme's strategies and approaches, relevance, finance management, efficiency, outputs delivery, effectiveness, impacts, sustainability, Innovation, up-scalability and replicability.

Learning and knowledge management

33. ***Knowledge Management*** – The Programme's knowledge management will be an essential element for delivery of Programme objectives, especially for learning related to development of sustainable fisheries systems for marine fisheries production and post-Harvest systems, development and sustainable utilization of inland fisheries as well as mariculture and aquaculture technologies to be piloted under FReMP. Two approaches will be taken: a) a knowledge management programme for the purpose of supporting within and between Programme learning; and b) support for a broader programme of knowledge management aimed at informing government decision-makers and influencing policy, notably concerning sustainable fisheries resources management in Eritrea.

34. The data management system will ensure that all reporting is completed and that information, reports and data are available in suitably accessible gender disaggregated formats. Evidence based learning is an important output and the knowledge management system, combined with the evaluations, must generate these evidence backed lessons. Lessons may be about approaches that do not work as well as those that do. In order to manage the knowledge and information of the Programme, the following activities will be conducted.

a) *Documenting lessons learnt, best practices and cases of success*: The NPCO will collect all available relevant information to document lessons learnt, best practices and cases of success. It could be based on information collected from: progress reports, meetings and interviews, monitoring and evaluation reports, outputs evidence provided by targeted groups, and other involved parties.

b) *Developing and delivering a lessons learnt study*: Based on the information collected along Programme implementation, the NPCO will develop an end of Programme Lessons Learnt Report, analysing the documented lessons learnt, best practices and cases. It will be first submitted to IFAD and, once feedback has been incorporated, if any, the report will be shared widely.

c) *Development of material for dissemination*: The NPCO will produce communication materials summarizing some of the success stories to be distributed through networks, and through policy dialogue. Based on analysis of the documented information, and the reports, material for dissemination will be produced at the end of the Programme; a mid-term Lessons Learnt Report might be developed. A short film about the Programme combining before and after footage will be shared with target groups, policy makers and other stakeholders.

Appendix 7: Financial management and disbursement arrangements

I. Summary of Financial Management arrangements

1. IFAD requires a Financial Management Assessment (FMA) as part of Project/Programmes designs. Accordingly, a FMA has been undertaken in accordance with the Financial Management Division (FMD) guidelines. The assessment was based on the National Programme Coordination Office (NPCO), Ministry of Marine Resources (MMR) in Asmara and prior knowledge of the operations of the Zobas under IFAD supported National Agriculture Programme (NAP) under the Ministry of Agriculture.

2. The proposed FReMP financial management arrangements are based on the key strengths and the suggested mitigations for the identified weaknesses. The summary of strengths and weaknesses of the proposed FM arrangements are tabulated below.

• Strengths	Weaknesses
• NPCO which will be the accounting hub has gained experience under the Fishery Development Programme (FDP) in the implementation of IFAD funded projects. This experience will be very useful for a quick start-up of FReMP. • In addition, the accounting software in use (Laccie) was designed specifically for donor funded projects and is able to generate the required financial reports. • Where there are gaps, FReMP has made provision for training of the staff. • The relatively very high level of financial discipline among staff at all levels in Eritrea provides the comfort that budgetary diversion and misappropriation of funds are very unlikely. • At the Zoba level and lower levels there are well developed manual accounting forms and books with clear instructions on their usage (e.g. vote books) on which FReMP can rely without having to introduce parallel approaches.	• A key weakness is the relatively high rate of staff turnover at Zoba levels. • Very low motivation levels given the low wage rates. • Generally low level of financial management capacity. • The internal audit department of MMR does not provide services to FDP. • CCU is relatively still weak to be able to manage the size of the fishing inputs planned and the related loans to fishers. • Laccie accounting software may not meet all the requirements of smart SOEs especially the linkage of SOEs to the budget code/ activity codes.

3. The following are the capacity constraints that need to be addressed, to improve assurance on use of funds:

- High staff turnover and in some cases no staff at all – The proposal here is to keep the FM requirement as simplified as possible. Given the high staff turnover and capacity levels at Zoba level, the Laccie software should be installed only at the NPCO. Experience from Programmes, such as NAP and the Post-Crisis Rural Recovery Development Programme (PCRRDP) shows that there is no much benefit of imposing such software to the ZPCOs. Whenever there is a change in staff, the training has to be repeated and this can happen very frequently. If the Zobas are allowed to use simple forms and books that they are already familiar with, or can quickly get familiar with, then the effect of staff turnover will be minimised as new entrants can quickly take over. Simple reconciled manual cash books will be sufficient for the ZPCOs to retire activity tagged advances received from the NPCO. Once advances are retired with sufficient paper-based and field-based evidence, these data will be processed at the NPCO in the Laccie accounting system.

- CCU is taking on a complex task of managing significant fishing inputs. However, the plan is to boost its capacity (skills and equipment), including the purchase and installation of the Loan Performance Software. In addition, the IFAD implementation support will pay particular attention, especially during the early stages of FReMP implementation.
- Strengthen or support the MMR internal audit to be able to gain confidence to include donor funded Projects/Programmes in their rolling internal audit plans. The internal auditors will be included in the Financial Management trainings to also better appreciate the Project/Programme accounting and disbursement processes.

4. **Overall Financial Management Risk Rating** – Eritrea's inherent risk is high as measured by Transparency International's Corruption Perceptions Index (CPI). The country's annual CPI in 2015 puts the country at 154th position (out of 168 scored countries) and the TI score is 18, compared to 20 in 2013 which puts the inherent risk to *High*. However, at Programme level, taking into account other control areas, the overall FReMP fiduciary risk assessment at design is assessed as *Medium.* FReMP design arrangements have taken into account this fiduciary risk and proposed appropriate mitigations, at Programme level, in order to reduce the risk. The main mitigation measures that have been proposed are: a) concerning staffing, any secondment/recruitment and changes will need IFAD's No Objection to ensure the right calibre of staff are in post; b) a proper chart of accounts to be used in Laccie (the computerised accounting system) and in the manual platforms at Zoba level; c) training in budgeting (proper sequencing of activities) to minimise cases of time wastage, as was the case under FDP when big procurements had to be cancelled even after tendering; d) capacity building of the CCU to be able to manage the large volumes of inputs and loans; e) specific FReMP bank accounts to avoid any forms of funds comingling; f) strengthening of the internal audit department by including them in FM-related training to boost their capacity and confidence to audit donor funded Projects/Programmes.

5. **Financial Management Conditions or Covenants** will include: a) the PIM, including the financial management manual, should be submitted within 6 months after the financing agreement gets in force; b) the Laccie accounting system should be coded with a FReMP specific chart of accounts acceptable to the Fund; c) some modifications in the Laccie accounting system will be needed to be able to generate the newly introduced smart SOEs. The conditions for withdrawal will include: a) the opening of the designated account in the Central Bank of Eritrea; b) the first annual work plan and budget; and c) confirmation that the NPCO is still or has been reconstituted. There is no proposed exceptions to General Conditions.

II. Programme financial profile

6. **Nature of Programme Eligible Expenditures –** FReMP eligible expenditures include the following expenditure categories: a) works; b) vehicles; c) equipment and materials; d) consultancies; e) training; f) salaries and allowances; and g) operating costs. The summary costs and detailed cost tables are presented in Appendix 9. The relative allocations are included in the financing plan table below.

7. **Financing Plan –** The Programme will be financed by the Government of Eritrea, IFAD grant, Federal Republic of Germany, GEF, FAO and beneficiary contribution. IFAD has confirmed a grant of USD 15 million (46.7% of the Programme costs), GEF has committed USD 7.89 million, representing 24.6% of total Programme costs, FAO will contribute USD 0.5 million (1.6% of total Programme costs), Federal Republic of Germany will contribute about USD 6 million (18.6 % of the Programme costs), and the beneficiaries are to contribute about 4.2% in form of participation in construction or setting up fishery site and purchase of petty inputs like fishing gears. This will cost about USD 1.35 million in monetary terms. The Government will finance the taxes and duties (USD 1.42 million, representing 4.4% of total costs).

8. The above financing will be **parallel co-financing**. For IFAD and Germany financing, the co-financing mechanism will be on a pari passu principles. Given the fact that GEF and FAO financed activities are of a special nature, the co-financing will be parallel and GEF will finance identified natural resources related activities whereas FAO will finance and manage the TA packages identified under FReMP. The detailed cost tables show the exact activity level attribution to the various financiers. This will in turn always be controlled through the AWPB for each respective year. For instance, there are activities that cannot be eligible under GEF financing. The detailed cost tables

provide a frame of what is eligible under, Federal Republic of Germany, GEF and IFAD grant and so will each successive AWPB. The respective allocations to the various financiers are as follows:

Eritrea
Fisheries Resources Management Programme (FReMP)
Expenditure Accounts by Financiers
(US$ '000)

	IFAD		GEF		FAO		Germany		GoE		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Exch.	Taxes)	Taxes
I. Investment Costs																	
A. Works	3,367	32.8	6,155	59.9	-	-	26	0.3	227	2.2	504	4.9	10,279	32.0	2,001	8,052	227
B. Vehicles	1,707	72.1	54	2.3	-	-	-	-	605	25.6	-	-	2,367	7.4	1,647	114	605
C. Equipment &Materials	2,206	22.5	353	3.6	-	-	5,929	60.4	487	5.0	845	8.6	9,820	30.6	5,853	3,480	487
D. Consultancies	562	38.3	356	24.3	500	34.1	-	-	48	3.3	-	-	1,466	4.6	1,319	98	48
E. Training	4,187	86.7	629	13.0	-	-	10	0.2	1	-	1	-	4,829	15.0	1,952	2,877	1
Total Investment Costs	12,029	41.8	7,548	26.2	500	1.7	5,966	20.7	1,368	4.8	1,351	4.7	28,761	89.5	12,772	14,621	1,368
II. Recurrent Costs																	
A. Salaries & Allowances	1,370	80.0	343	20.0	-	-	-	-	0	-	-	-	1,713	5.3	171	1,542	-
B. Operating costs	1,601	97.0	-	-	-	-	-	-	50	3.0	-	-	1,650	5.1	495	1,106	50
Total Recurrent Costs	2,971	88.3	343	10.2	-	-	-	-	50	1.5	-	-	3,363	10.5	666	2,647	50
Total PROJECT COSTS	15,000	46.7	7,890	24.6	500	1.6	5,966	18.6	1,417	4.4	1,351	4.2	32,124	100.0	13,438	17,269	1,417

9. The design of FReMP has not ring-fenced or earmarked any particular funding ceilings to national or individual Zobas. These will be determined progressively through the AWPB to allow for sufficient inbuilt flexibility during implementation.

III. Implementation Arrangements

A. Implementing and Participating Organizations with Fiduciary Responsibilities

10. **The Lead Programme Implementing Agency –** The Lead Programme Implementing Agency will be the Ministry of Marine Resources (MMR) that will have a dedicated National Programme Coordination Office (NPCO). Just like under FDP, MMR is the line Ministry to implement the FReMP on behalf of the official grant recipient (Ministry of Finance). The MMR, using its NPCO, has implemented donor financed projects in the past, the most recent being the IFAD-supported FDP. MMR has experience in IFAD disbursement processes.

11. **Roles and Responsibilities of the other Implementing Organizations –** These will include the following:

- CCU: Will continue to play the role it has started under FDP of managing the fishing inputs on a loan basis to fishers and other actors on the supply chain. The plan is to transform the CCU into a fully-fledged sustainable asset financing entity to manage the fishery inputs supply on a revolving mechanism basis.
- Six Zobas: It is just prudent that activities that are localised at the Zoba levels, such as the inland water reservoirs, catchment treatment, etc. be managed and expenditures met at the Zoba levels. Therefore, the participating Zobas will have a financial management role to play.

12. MMR will use its NPCO to implement FReMP but the Minister will remain signatory to payments and contracts; the Ministry's head of Finance and Administration will also be a key co-signatory. The CCU is still under MMR and is really not autonomous as yet. Once it gets the autonomy as envisaged, then a Memorandum of Understanding (MoU) will be necessary (MMR and CCU). For all the participating Zobas, a MoU will be needed and will define the fiduciary responsibilities of either party (MMR and the Zobas).

13. The accounting hub will be centralised at the NPCO. To the extent possible, payments will be centralised although the work planning and budgeting processes will be decentralised. However, as stated above, for localised payments, it will be necessary to transfer activity tagged advances to the participating Zobas. FReMP will be national in scope covering all six Zobas, including the coastal areas covered under the FDP and inland areas, particularly targeting water reservoirs for aquaculture and up-country fish markets. In the inland Zobas (Anseba, Debub, Gash Barka, and Maekel), the Programme will be site-specific and will operate in areas with selected dams, principally to promote effective and sustainable inland fisheries to boost household incomes and nutrition for rural populations.

IV. Financial Management Risk Assessment

A. Inherent Risks and Country Issues

14. According to extracts from publicly available Public Financial Management assessments (World Bank's Country Policy and Institutional Assessment (CPIA) ratings for Eritrea), there is still need for improvement in the areas of economic management and structural policy reforms. Specifically, regarding **Public Financial Management (PFM),** some improvements have been noted, including compliance with the international best practices, such as chart of accounts. Fiscal management is constrained by the absence of a Medium-Term Expenditure Framework (MTEF), and the lack of transparency in the dissemination of basic financial information, including the budget. Issues still remain in budgeting, quality reporting and access to information. There is limited capacity due to lack of appropriately qualified and experienced personnel, such as accountants, procurement officers, etc.; these issues are among the major contributors to PFM weaknesses. However, the publically available reports indicate that the GoE has embarked on a capacity building programme to improve and strengthen public financial management. These reports also indicate that there is an IMF designed chart of financial accounts, computerisation of the in-land revenue and customs divisions.

15. Eritrea's inherent risk is high as measured by Transparency International's Corruption Perceptions Index (CPI). The country's annual CPI in 2015 puts the country at 154th position (out of 168 scored countries) and the TI score is 18, compared to 20 in 2013 which puts the inherent risk as High.

16. However, IFAD's overall experience in Eritrea shows a medium risk. Projects are allowed to operate in line with the financing agreements, approved AWPBs and mission recommendations but implementation capacity remains a major constraint.

B. Project Control Risks

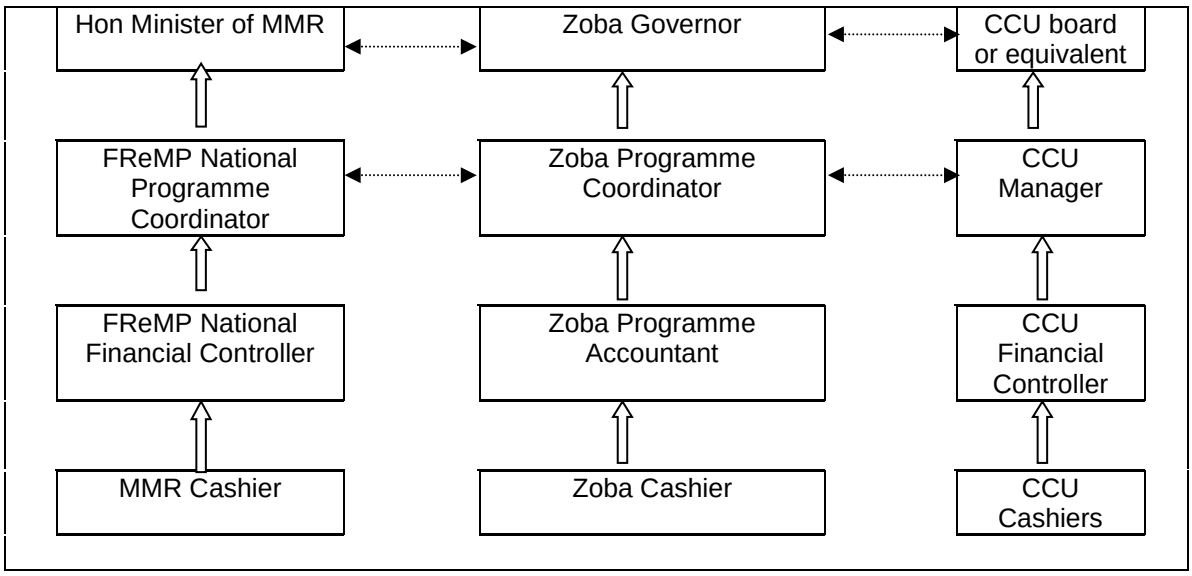
Table 2. Summary of FM Risks and Mitigating Actions

	Initial Risk Assessment	Proposed mitigation	Final Risk Assessment
Inherent Risk			
1. TI Index	-	-	H
Control Risks			
1. Organisation and Staffing	H	Par 19-21	M
2. Budgeting	H	Par 22-25	M
3. Funds Flow and Disbursement arrangements	H	Par 26-31	M
4. Internal Controls	M	Par 31-34	M
5. Accounting systems, Policies and Procedures	M	Par 35-37	M
6. Reporting and Monitoring	H	Par 38-40	M
7. Internal Audit	H	Par 41	H
8. External Audit	L	Par 42	L
FReMP Fiduciary Risk @ Design	**H**		**M**

V. Financial Management and Disbursement Arrangements

17. **Financial Management Organization and Staffing** – Under this area, the objective is to ensure that staff will be adequate in terms of numbers, skills, capabilities, and experience. The players in FReMP financial management are as shown in Fig 1 below showing the diversity of the accounting environment.

Fig 1: FReMP Financial Management organisational structure



18. Under MMR, FReMP will continue to have a well-staffed and resourced NPCO. Dealing with Zobas and managing the inputs through the CCU has the potential to overstretch Programme financial management. Thus, there will be a dedicated full time financial controller at the NPCO and for adequate segregation of duties also a full time procurement officer. Similarly, at each Zoba, there will be a dedicated full time FReMP Programme Accountant also on full time and dedicated procurement officer. The CCU will receive further strengthening in addition to the support already provided under FDP.

19. FM risks related to staffing include:

- High staff turnover at Zoba level;
- Low financial management capacity – lack of adequate number of qualified accountants in the country.
- Relatively inexperienced CCU may not be able to manage the volumes of inputs to fishers.

20. The proposed mitigation measures for the FM related risks under the area of staffing and organisation are:

- Simplify the FM requirements especially at Zoba level. FReMP design has deliberately proposed the use of financial management tools already familiar for day-to-day Zoba operations as opposed to imposing new sophisticated ones at Zoba level, such as Laccie. This will ensure that staff turnover at Zoba level does not significantly disrupt implementation as the replacement ones will not have to undergo any rigorous training in packages, such as Laccie. Even with manual platforms, such as vote books as used at Zoba level in the normal GoE transactions, there are enough safeguards to protect Programme funds. Experience has shown that it would be futile to introduce accounting packages all the way to zoba level. Under this arrangement, the accounting hub will be at the NPCO level that will receive returns from the Zobas (in manual form) and process them through the Laccie accounting system. As part of start-up activities, staff, including those at the Zoba level, will be trained in good filing approaches and expenditure documentation. Checklists will be provided for the various expenditure categories to ensure Zobas submit all the required documentation as they retire advances;

- IFAD's 'No Objection will be needed regarding the staff seconded or recruited to fill the key positions. This is aimed at ensuring that the right calibre of staff are in post;
- Continuous training and handholding of staff at different levels. IFAD will provide frequent implementation support to ensure that identified capacity gaps get filled as soon as possible so that implementation does not get compromised in any way;
- Centralise bigger payments through the NPCO so that it is only localised transactions in respect of which funds will be transferred to the other cost centres.

21. Initial and residual risk in relation to staffing: The initial risk under this area is considered as High. The proposed mitigation measures put the residual risk to a medium level.

22. **Budgeting –** It is important to ensure that FReMP will be implemented in an appropriate budgeting system. Budgets will be developed through a bottom-up approach with each ZPCO coming up with its part of the AWPB. These will be consolidated along with that of NCPO/national level activities to develop the consolidated AWPB. The Programme Monitoring and Evaluation Officer will coordinate the budget preparation processes with financial controller taking charge of budget synchronising. The Officer will ensure that AWPBs are prepared for all significant Programme activities in sufficient detail to provide a meaningful tool with which to monitor subsequent performance. Budgeting procedures and related timetables will be detailed in the PIM.

23. The FM risks under the area of budgeting include the following**:**

- Under FDP, AWPB execution was consistently very low from year to year and this is an indicator of unrealistic budgeting from year to year;
- Activity scheduling was a challenge in terms of a proper chronology of what should precede what in a logical order. For instance, under FDP, the procurement of boats had reached contract award stage even before the Cooperatives to take the boats on loan basis were formed/identified. The procurement had to be cancelled, creating a huge time wastage and low fund absorption levels.
- Some cases were reported in supervision missions where the budget was not posted in the Laccie accounting system, thus creating some laxity in budget control.

24. The proposed mitigations for the FM related risks under the area of budgeting are:

- The activity and cash planning training will be included in start-up activities. The aim here is to ensure that realistic activity scheduling will be considered as part of budgeting and that there will be capacity to prepare the monthly treasury plans to improve AWPB execution rates;
- Budgetary control systems – At the NPCO, the key budget control tool will be the Laccie system. Once the budget is approved, it will be posted in the accounting system. Before commitments are entered into or payments are processed, the status of funds on the respective budget lines will be checked. Direct from Laccie, budget vs actual reports will be included in the monthly management accounts to inform management decision and control. A key feature to be invoked which was relatively weak under FDP is the aspect of commitment control – encumbering funds at the point of entering a contract;
- At Zoba level; the budget control system will be the very effective vote books. No payment will be processed until the respective budget line in the vote is updated on a reducing balance basis.
- The CCU, as discussed later, will maintain an accounting package that can handle its operations including budget control.

25. Initial and residual risk in relation to budgeting – Start-up activities will emphasise the importance of realistic budgeting and budget control. Furthermore, the cumulative experience acquired by the NPCO should further mitigate the identified risks. Key budget forms and templates will be included in the PIM. The initial risk under this area is 'High' with the residual risk as 'Medium'.

26. **Disbursement Arrangements and Flow of Funds** – The objective is to ensure that the proceeds of the IFAD grant and Germany financing will be used for their intended purposes. The following is the summary of the funds flow arrangements:

- Bank Accounts – The designated account will be the Central Bank of Eritrea (CBE). At the national level, the Central Bank of Eritrea also serves the operating needs. However, at Zoba level, commercial bank accounts (in the commercial bank of Eritrea) will be opened;
- Disbursement procedures – A sufficient authorised allocation (initial advance) will be provided—estimated up to USD 5 million. With a sufficient authorised allocation, the key payments will be through the designated account. Direct payments from IFAD will be minimal, limited only to very large payments over the equivalent of USD 200,000;
- Where NGOs or Community organisations will be involved in disbursement process, clear contracts/Memoranda of Understanding (MoUs) will be required. These contracts will include the financial management arrangements and reporting requirement between the NPCO and the service provider. Safe guards, such as the opening of specific bank accounts for FReMP funds, will be given due consideration as part of drafting the contracts with service providers;
- Downstream funds flow monitoring and documentation – Each participating Zoba will necessarily open FReMP specific bank account (s). These bank accounts will be operated in a cascading imprest basis as an inbuilt incentive for the Zobas to make expenditure justification in a timely fashion. This arrangement will also apply for the CCU;
- Transactions at sub-Zoba and lower levels will be managed through working imprest to implementers. The GoE systems are strong in terms of following up un-retired working imprests.

27. **FReMP Funds Flow Chart –** The Programme is designed to have multiple funding sources: IFAD grant and other external funds (Federal Republic of Germany, FAO, GEF), GoE, and Beneficiaries. Financing modalities for IFAD cofinancing funds will be defined in respective subsidiary agreements with each of the cofinanciers. IFAD managed disbursements (IFAD grant and Germany contribution) will go through national systems. For IFAD, GEF and Germany grants, separate designated bank accounts in USD will be opened in the Central Bank of Eritrea and managed separately for tracebility and accountability purposes. Corresponding operating account for each financier managed by the NPCO (with the Minister of MMR and the Head of Finance and Administration being the key principal signatories) will be opened also in the Central Bank of Eritrea in Eritrean Nakfa. There will also be a counterpart funds bank account managed by the NPCO. The funds flow chart is attached as Annex 1

28. The FM risks under the area of funds flow and disbursement include the following**:**

- There is a risk of unsystematic capture of beneficiary contribution and counterpart funds to some extent;
- The spread of the Programme into 6 Zobas will result into some difficulty in collating expenditure justification documents to support the SOEs;
- Experience shows that there is a potential risk of cross-financing across the parallel funding sources as was the case under the closed PCRRDP that had similar parallel multiple funding sources;
- With the spread of bank accounts across the 6 Zobas and national level in the Central Bank of Eritrea, undertaking the designated account reconciliations will be generally cumbersome.

29. The proposed mitigation measures for the FM related risks under the area of funds flow are:

- Include in the PIM clear approaches and forms for capture of beneficiary and counterpart contributions;
- Copies of supporting documents will be sent to the NPCO as part of expenditure justifications by the Zobas;
- Cross-financing across the parallel financing sources will be controlled through the AWPB. The AWPB will include activity attribution to each funding source;
- The use of designated account reconciliation as part of monthly management account will be emphasised during the start-up activities. This will reveal any aspects of cross-

financing/inter-fund borrowing for immediate resolutions, internally even before being spotted by IFAD missions or auditors.

30. Initial and residual risk in relation to funds flow – Given the above risk profile, especially the spread across the six Zobas, the initial risk is assessed as 'High' under the area of funds flows. With the proposed mitigation measures, the residual risk is 'Medium'. Care will be required in collating the supporting documentation from the six Zobas and the CCU.

31. **Internal Controls** – At the Programme level, internal controls will be set to ensure that funds reach intended beneficiaries. The key controls should include evidence of funds reaching intended beneficiaries and financial management manuals and rules on use of funds. In a sample of transactions at FDP, there are adequate segregation of duties with the following functional responsibilities performed by different units or persons: a) authorization to execute a transaction; b) recording of the transaction; and c) custody of assets involved in the transaction. In addition, the following internal controls are proposed: a) From experience gained under NAP, FReMP will adapt itself to tools at Zoba level that the finance teams are already familiar with and the accounting consolidation hub will be at NPCO; b) at the Zoba level, the Governors and heads of Finance and Administration units will be key principal Signatories; c) Budget control at Zoba level will be through use of vote books and at the NPCO level, the Laccie accounting system will ably manage this. Staff under FReMP will receive training in the use of Laccie accounting software as part of the start-up activities. Bank reconciliations will be done within the Laccie system on a monthly basis and will be approved formally by the Programme coordinator. Other internal controls to be detailed in the PIM will include:

- Budget control within the Laccie system;
- Backup of accounting records;
- Improvement in the capture and reporting of counterpart funds;
- The MMR internal audit will include FReMP in their rolling internal audit plans.

32. The FM risks under the area of internal controls include the following**:**

- Managing of the fishing inputs/equipment under a revolving fund facility by the relatively young CCU will come with some challenges initially. The fiduciary risks are that the volume of the fund could become too heavy to be managed by the CCU and accounting misstatements may occur purely due to capacity gaps;
- With the staffing capacity gaps identified earlier, even if the best internal control environment is put in place, actual implementation may be impaired;
- The relatively weak internal audit may not help enforce the prescribed internal control environment.

33. Mitigations, initial and residual risk in relation to internal controls – Specific provision has been made under FReMP to continue to strengthen the CCU to manage the increasing volume of transactions. IFAD implementation support Missions will emphasise a guiding and coaching approach to handhold both the NPCO and CCU is the implementation of a sound internal control environment. Even with the pledged support, this risk is still considered at Medium level.

34. **Accounting Systems, Policies and Procedures** – Laccie accounting software that has successfully been used under FDP and other IFAD supported Projects in Eritrea will also be used under FReMP. However, the CCU will need a more specialised loan portfolio management software. The Laccie software will be installed only at the NPCO; due to capacity gaps at the Zobas, there is no benefit of imposing such software to ZPCOs. Simple reconciled manual cash books will be sufficient for the ZPCOs to retire activity tagged advances received from the NPCO. Once advances are retired with sufficient paper based and field based evidence, these data will be processed at the NPCO in the Laccie accounting system.

35. The FM risks under the area of accounting systems include the following**:**

- The risk that the Laccie software may not be able to be adjusted to fit the requirements of Smart SoEs with a linkage to AWPB codes;

- Data entry of manual returns from the six Zobas may prove bulky for the NPCO staff.

36. Mitigation measures, initial and residual risk in relation to accounting system – IFAD implementation support Missions will progressively support the NPCO to continuously improve the Laccie accounting system to be able to fulfil the requirements of the Smart SoE approach. An Accounts Assistant may be added to the NPCO in case the data entry requirements at the NPCO become very bulky. As part of start-up activities, a FReMP specific chart of accounts will be developed and used in Laccie accounting systems. Under this area, the risk assessment remains medium.

37. **Financial Reporting –** The objective of monitoring and reporting is to ensure that complete, accurate and timely reports are produced in accordance with International Public Sector Accounting Standards (IPSAS) cash basis. The Programme will use Laccie accounting software which is capable of providing accurate and timely FReMP-specific financial reports (e.g. General Ledger, and maintaining budget control). The NPCO will be the financial reporting hub. IFAD will, in addition to the annual audited financial statements, require interim financial reports on a six monthly interval as per IFAD's interim financial reporting guidelines. It is planned, for internal auditor of MMR, to include FReMP in the rolling audit plan which will facilitate compliance with the interim reporting requirements. The CCU, by design right from FDP is meant to, eventually, be autonomous and will, therefore, prepare a separate set of financial statements from FReMP. It will account on accrual basis as opposed to the FReMP which will account on cash basis. The ultimate goal is for the CCU to be financially self-sufficient and to live beyond the Programme life time. As part of the CCU strengthening, an accounting manual with a comprehensive chart of accounts on accrual basis will be developed.

38. The FM risks under the area of accounting systems include the following**:**

- Delays of returns from the six Zobas may delay the updating of the computerised accounting system which in turn will affect time and quality of the financial reports;
- Financial reporting for CCU operations will be on accrual basis requiring a balance sheet and other aspects of corporate kind of financial statements. There is a risk that the accounting system may not be set-up properly because of capacity gaps and CCU may get sub-summed into FReMP-mode of accounts on cash basis.

39. Mitigations, initial and residual risk in relation to financial reporting – The Programme should provide technical support to the CCU to set-up an accounting system that is able to handle and report on the volume of inputs and loans on accrual basis. CCU is intended to become autonomous that is to eventually be converted into a corporate entity reporting to Board of Director. The risk here also remains at medium level.

40. **Internal Audit –** The rolling internal audits will be conducted to ascertain whether FReMP implementation follows the PIM and complies with various financing covenants. Under FDP, the internal audit department of MMR did not provide any service to the Project. The team does not have experience in financial management and disbursement of IFAD-funded Projects/Programmes. The risk assessment is therefore high that internal audit may not provide the required service. FReMP proposes to include the department in the start-up trainings but the risk still remains as high. The option of outsourcing the service to a private audit firm is also open just as has been the case for external audit.

41. **External Audit** – The Programme will have annual independent audits which will provide the mandatory opinions required by IFAD (Separate opinions on the general purpose financial statements, operation of the designated accounts and the use of the SoE procedure). The GoE audit processes will be used. As has been the case under FDP, the Government Auditor General will have discretion to do the audit or to appoint an independent private audit firm acceptable to the Fund. Either way, the audit terms of reference (TORs) will require the Fund's 'No Objection' on an annual basis. The quality of audits under FDP was satisfactory and this is a *low risk* area. Some delays in starting the audit for the year ended 31st December 2015 have been noted. However, prior year audit was submitted in time and was of acceptable quality. The auditors will be required, and this will be included in the TORs, to pay particular attention to the operations of the CCU, specifically the quality of the loan portfolio and the management of input stocks and the resolving fund.

VI. Implementation Readiness

42. The actions needed to mitigate FM risks are summarised the table below.

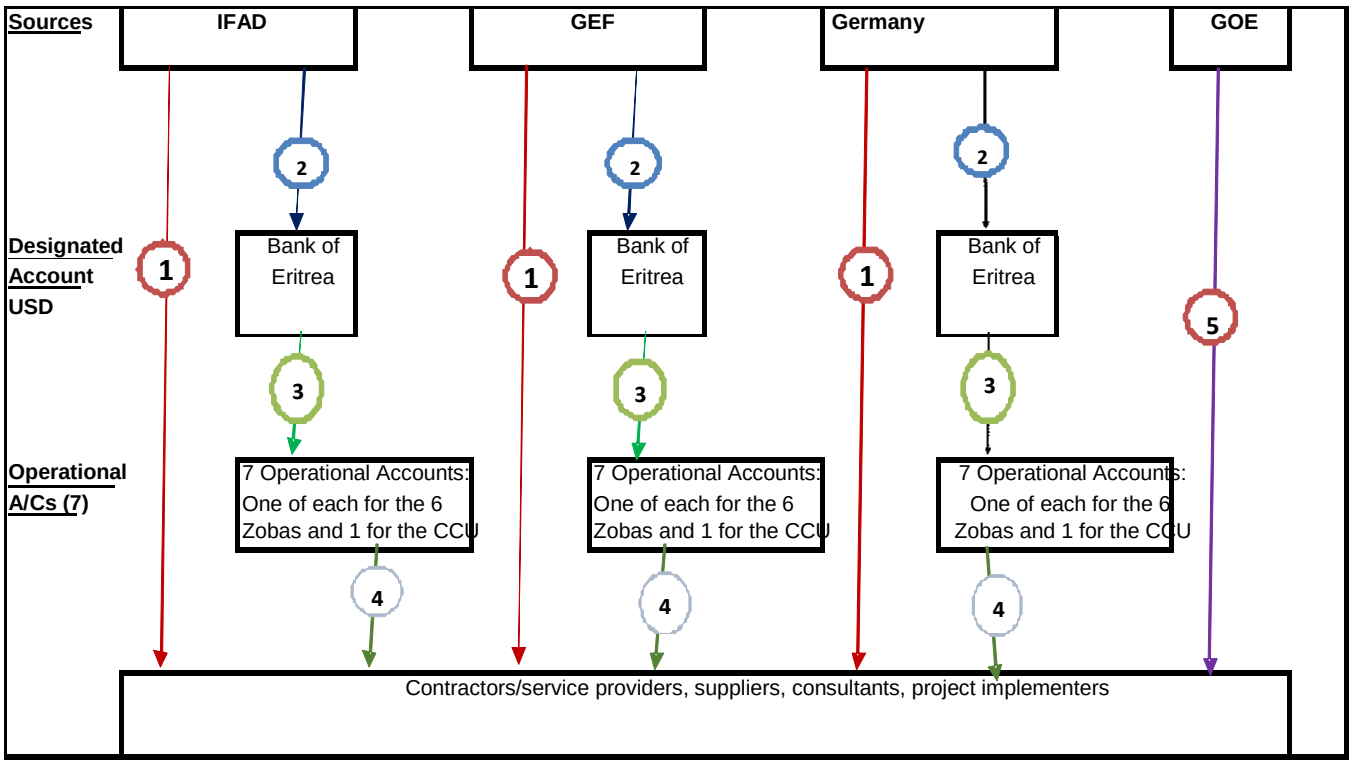
(a) **Table 3: FM Actions Summary**

	Action	Responsible Party/Person	Target Date/Covenants[40]
1	• Obtain IFAD No Objection for staff seconded or recruited to fill the key positions.	MMR/IFAD	Within first six months
2	• Provide training to staff on budgeting and budget control systems.	Technical Assistance	Part of start-up activities
3	• Open the required bank accounts	MMR	Withdrawal condition
4	• AWPBs to clearly attribute activities to the respective financiers.	NPCO	As part of annual planning and budgeting
5	• Develop a FReMP specific chart of accounts and finalise PIM that should include a comprehensive financial management manual	NPCO	Within first six months
6	• Reset Laccie to meet the requirements of smart SoEs.	NPCO with Technical Assistance	Part of start-up activities
7	• FReMP should provide technical support to the CCU to set-up an accounting system that is able to handle and report on the volume of inputs and loans on accrual basis.	Technical Assistance	Within first six month
8	• MMR internal auditors to provide audit services to FReMP failure of which the service should be outsourced.	MMR- Head of Finance and Administration	From inception of implementation
9	• External auditors shall pay particular attention to the operations of the CCU.	MMR to include in the auditors Terms of Reference	As part of each year's external audit

43. **FM Supervision Plan** – The risk profile described above requires IFAD implementation support especially in the first years of implementation. IFAD Missions should include sufficient provision for handholding the NPCO to put in place the systems and controls to manage the diversity of FReMP and to handhold the CCU in managing an increasing loan portfolio on a revolving fund basis. In the first two years, it is proposed that there should be at least two IFAD Missions supplemented by a third FM implementation support/follow-up Mission to ensure FM systems and tools are put in place and implemented.

[40] Indicate if covenants are required in Financing Agreement for each of these: effectiveness condition or disbursement condition or dated covenant.

Annex 1: Flow of Funds Chart



a/ FAO grants towards technical assistance may be managed through one of the bank accounts to avoid too many bank accounts.

An explanation of each of the above lines on the FReMP funds flow chart is presented below:

- **Line 1.** Direct payments from IFAD, Federal Republic of Germany or GEF to suppliers, etc. for disbursements valued with a minimum value of USD 200,000.
- **Line 2.** Initial allocation into the Designated Accounts (advances from IFAD grant, GEF and Germany) and subsequent replenishments. This advance will be replenished until towards Programme closure when recovery of the advance starts to take place. With the replenishment system, the full initial advance should always be reconcilable within the replenishment cycle as any ineligible expenses incurred will be replenished back. Towards Programme closure the advance to the Designated Account will be recovered by way of justification of expenditure accounted for by FReMP. When recovery commences, FReMP will submit SOE justifications and will not be replenished in full, with a portion going to the credit of the advance account.
- **Line 3.** Transfer of IFAD Grant, GEF and Germany funds from the designated account to the respective FReMP Operational Accounts for covering eligible local costs in Nakfa.
- **Line 4.** Payments of IFAD Grant, GEF and Germany portion of costs in Nakfa.
- **Line 5.** GoE parallel financing of its counterpart contribution to FReMP.

Appendix 8: Procurement

Overall Procurement Assessment

1. Specifically in relation to procurement, the IFAD General Conditions focus on the emphasis placed on using the Borrower/Recipient's procurement regulations, provided they are deemed to be consistent with IFAD's guidelines. To this end, the IFAD procurement guidelines require a procurement assessment to be done as part of Programme designs.

2. **Country Procurement Systems Assessment –** The procurement framework in Eritrea is based on a policy document issued by the Ministry of Finance. There are checks and balances within the system which, if utilised, ensure the public procurement is undertaken transparently and competitively.

3. As per IFAD procurement guidelines, irrespective of the result of assessment, all procurements under International Competitive bidding (over the equivalent of USD 200,000) will follow the World Bank Procedures and templates. Otherwise the procurement policy document issued by the Ministry of Finance will apply but where there is inconsistence with IFAD guidelines the latter will prevail.

4. **IFAD procurement handbook** – This is a key reference document that contains the key guidelines, templates and forms that FReMP will adapt as already used under FDP. Key among these are:

a) Procurement plan templates separate for works, goods and services;
b) Forms for issuance and receipt of bids;
c) Templates for bid evaluation reports;
d) Contract Monitoring forms, etc.

Programme Specific Procurement Assessment and Arrangements

5. In addition to the overarching country procurement assessment, during Programme design stage, IFAD is required to undertake a more comprehensive assessment of the degree of practical implementation of the regulatory framework, and the procurement capacity of the agency designated to undertake the Programme procurement. The overall assessment is partially satisfactory with some of areas for improvement under FReMP: (a) procurement planning will need to be improved to avoid the front loading problem that FDP has continuously faced; and (b) given the time lags experienced during FDP which, in turn, affected disbursement, FReMP design has made proposals on how to improve procurement efficiency. Under FReMP design, procurement efficiency measurement will be integral to procurement reporting and will explain the key bottlenecks/constraints and recommend areas of improvement, ideally indicating average time for IFAD 'No Objections'. The procurement efficiency measure template below will separately track the following for services, goods and works: a) contracts planned to be awarded during the Financial Year and contracts actually awarded; b) average processing time; and c) expected contracts to be awarded during the Financial Year.

Suggested template to measure procurement efficiency[41]

Type	Contracts to be awarded during the past 12 months (#)	Contracts awarded during the past 12 months (#)	Achievement (%)	Average processing time (Days)	Expected contracts to be awarded during the next 12 months (#)
Services					
Goods					
Works					
TOTAL					

[41] The FReMP procurements specialist will, in his/her progress reports, explain key bottlenecks and constraints and recommend areas of improvement, ideally indicating average time for IFAD 'No Objections', NPCO processes.

6. **Use of Framework Contracts –** Given the phasing nature of FReMP, there are repetitive procurement items (fishing inputs and equipment) that will be needed from time to time by fishing groups of cooperatives throughout the time of the Programme. This makes the use of framework contracts a very useful approach under FReMP as opposed to having to run the bid repetitively each year and to also avoid overstocking of items. Fortunately, through FDP, NPCO has gained experience in the use of Framework contracts.

7. Multiple providers with different prices – Framework agreements can be concluded with a single provider or with several providers, for the same supplies, works or services at same or deferring prices. In the latter case, there must be at least three providers, provided that there are sufficient providers satisfying the selection criteria and who have submitted compliant bids meeting the award criteria. The agreement will establish the terms which will apply under the framework, including delivery timescales and daily or hourly rates.

8. Where a framework agreement is concluded with one provider, call off orders, under the agreement should be issued on the basis of the terms laid down in the agreement. There should not be substantive change to the specification or the terms and conditions agreed at the time that the framework is awarded.

9. Where the framework agreement has been entered into with several providers for several items at different prices, the NPCO shall issue a call off order to the provider for only the item(s) with the lowest price.

10. Where the lowest priced bidder cannot supply the full or some of the requirements of a particular call off order at the time required, the NPCO shall make a call off order from the next provider with a higher price for the supplies the first provider had failed to deliver.

11. **Dealing with Zobas and other Implementing Partners –** NPCO is the procurement hub of FReMP to deal with any national or international procurement. Zobas, as part of their AWPBs, will submit a list of procurement requirements that will be consolidate at the NPCO into a procurement plan to accompany each consolidated AWPB.

12. **Staffing –** There will be a FReMP procurement unit resourced with a full time procurement specialist at NPCO. Each ZPCO will also have a procurement officer. The relevant terms of reference will produced and included in the PIM.

13. **Permanent Tender Committees –** For items that are common across more than one Zoba or generally requiring national and international bidding, these will be procured nationally with contract award decisions taken by the MMR permanent tender committee.

14. ***Ad hoc* Evaluation Committees –** Each competitive procurement package will have an *ad hoc* evaluation committee comprising of members skilled in the subject matter at hand. Evaluation committee members should not be restricted to only NPCO/ZPCO members, to ensure sufficient skill mix; independent external members may also be used.

15. **Procurement Methods –** FReMP will use a mixture of standard procurement packages (good/services) and unique aspects. Procurements over USD 30,000 to USD 200,000 will be done under National Competitive Bidding (NCB) but non-Eritrean domiciled suppliers also eligible to participate. Procurement below USD 30,000 will still be subject to competition but restricted to invitation of three to five prospective suppliers or service of providers. Procurement packages estimated over USD 200,000 will be under International Competitive Bidding (ICB). IFAD 'No Objections' will be required for all items over USD 50,000 for services and USD 100,000 for goods and works. These thresholds will be reviewed from time to time depending on the fiduciary risk assessment.

16. **The use of Force Account –** This is a popular procurement in Eritrea that is justified given the relatively weak private sector in civil works. This method will be used under FReMP but will have to be

fully justified right from procurement planning. In addition, to the extent possible, significant equipment to be installed as part of the works will be treated as separate procurement packages and procured competitively. Even under the use of Framework contracts, the prerequisite IFAD 'No Objections' will still be necessary. A complete set of documentation, including MoUs with the Government Agency executing the works will be a requirement.

Appendix 9: Programme costs and financing

I. Main assumptions for Cost Estimation

1. In deriving FReMP costs, the assumptions below were used:

- **Inflation** – The Inflation Rate in Eritrea is currently 13.72 percent and is projected to average around 10.8% during FReMP implementation. Most of the costings are in USD terms and international inflation rate of 3% has been used;
- **Exchange Rates** – In Eritrea, the foreign exchange rate is controlled by the Central bank of Eritrea by imposing a fixed rate. During FReMP design, the fixed exchange rate was 1 USD = ERN 15.This is the rate that has been used for cost estimation in COSTAB for the entire Programme period since this rate has been stable/unchanged for many years;
- **Taxes and Duties** – Value Added Tax is not applicable in Eritrea. However, there is a general sales tax that varies between 5% and 10%. This has been factored in the costs as GoE contribution. There are various import duties levied at customs and estimates have been factored in the cost tables;
- **Physical Contingencies** – Provision for physical contingencies has been included in the cost estimates at a rate of 5%; these were deemed necessary, especially under works category.

II. Project Costs

2. The total combined FReMP investment and incremental recurrent costs, including physical and price contingencies, are estimated at US$ 32 million (ERN 539 million). Table 1 below presents a breakdown of the costs by FReMP components and subcomponents. The detailed cost tables and additional summary tables are presented in Annexes; these are attached herewith. The investment in Component 1: Develop Sustainable Fisheries Systems, in base costs totals US$ 11.4 million (40% of total base costs) while Component 2: Fisheries Enterprises Support Services, accounts for US$ 9.3 million (32% of total base costs). Component 3: Institutional Strengthening and Implementation Support accounts for US $ 8.1 million (28% of total base costs).

Table 1: Programme Cost by Component

Eritrea
Fisheries Resources Management Programme (FReMP)
Components Project Cost Summary

	(ERN '000)			(US$ '000)			% Foreign	% Total Base
	Local	Foreign	Total	Local	Foreign	Total	Exchange	Costs
A. Develop Sustainable Fisheries Systems								
1. Develop Marine Fisheries Production and Post-Harvest Systems	72 331	12 071	84 402	4 745	783	5 528	14	19
2. Development and Sustainable Utilization of Inland Fisheries	46 292	23 169	69 460	3 074	1 532	4 606	33	16
3. Market development and Promotion of Fish consumption	9 491	10 623	20 114	615	688	1 303	53	5
Subtotal	128 114	45 862	173 976	8 434	3 004	11 437	26	40
B. Fisheries Enterprises Support Services								
1. Entrepreneurial Capacity Development	15 588	10 392	25 981	1 010	673	1 683	40	6
2. Strengthen Input Supply Services	47 172	70 647	117 819	3 056	4 576	7 632	60	26
Subtotal	62 760	81 039	143 800	4 066	5 250	9 315	56	32
C. Institutional Strengthening and Implementation Support								
1. Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector -	15 450	36 575	52 025	1 002	2 382	3 384	70	12
2. Programme Coordination and Implementation Support Services	52 633	19 826	72 459	3 410	1 284	4 694	27	16
Subtotal	68 083	56 401	124 484	4 412	3 666	8 078	45	28
Total BASELINE COSTS	258 957	183 302	442 260	16 911	11 920	28 831	41	100
Physical Contingencies	4 999	4 469	9 468	324	290	613	47	2
Price Contingencies	47 223	39 939	87 162	1 451	1 229	2 680	46	9
Total PROJECT COSTS	311 179	227 711	538 890	18 686	13 438	32 124	42	111

III. Financing Plan

3. The Programme will be financed by the Government of Eritrea, IFAD grant, Federal Republic of Germany, GEF, FAO and beneficiary contribution. IFAD has confirmed a grant of USD 15 million (46.7% of the Programme costs), GEF has committed USD 7.89 million, representing 24.6% of total Programme costs, FAO will contribute USD 0.5 million (1.6% of total

Programme costs), the Federal Republic of Germany will contribute about USD 6 million (18.6 % of the Programme costs), and the beneficiaries are to contribute about 4.2% in form of participation in construction or setting up fishery site and purchase of petty inputs like fishing gears. This will cost about USD 1.35 million in monetary terms. The Government will finance the taxes and duties (USD 1.42 million, representing 4.4% of total costs). The details of financing arrangements are shown in Table 2.

Table 2: Financing Plan by Components (USD'000)

4. **GoE Contribution –** GoE contribution will be in form of duties and taxes mainly the duties and taxes on vehicles, equipment and motor cycles. The amount of USD 1.42 million relates purely to duties and taxes.

Annex 1: Summary Cost Tables

Table 1: Component Project Cost Summary

Eritrea
Fisheries Resources Management Programme (FReMP)
Components Project Cost Summary

	(ERN '000)			(US$ '000)			%	% Total
	Local	Foreign	Total	Local	Foreign	Total	Foreign Exchange	Base Costs
A. Develop Sustainable Fisheries Systems								
1. Develop Marine Fisheries Production and Post-Harvest Systems	72,331	12,071	84,402	4,745	783	5,528	14	19
2. Development and Sustainable Utilization of Inland Fisheries	46,292	23,169	69,460	3,074	1,532	4,606	33	16
3. Market development and Promotion of Fish consumption	9,491	10,623	20,114	615	688	1,303	53	5
Subtotal	128,114	45,862	173,976	8,434	3,004	11,437	26	40
B. Fisheries Enterprises Support Services								
1. Entrepreneurial Capacity Development	15,588	10,392	25,981	1,010	673	1,683	40	6
2. Strengthen Input Supply Services	47,172	70,647	117,819	3,056	4,576	7,632	60	26
Subtotal	62,760	81,039	143,800	4,066	5,250	9,315	56	32
C. Institutional Strengthening and Implementation Support								
1. Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector -	15,450	36,575	52,025	1,002	2,382	3,384	70	12
2. Programme Coordination and Implementation Support Services	52,633	19,826	72,459	3,410	1,284	4,694	27	16
Subtotal	68,083	56,401	124,484	4,412	3,666	8,078	45	28
Total BASELINE COSTS	258,957	183,302	442,260	16,911	11,920	28,831	41	100
Physical Contingencies	4,999	4,469	9,468	324	290	613	47	2
Price Contingencies	47,223	39,939	87,162	1,451	1,229	2,680	46	9
Total PROJECT COSTS	311,179	227,711	538,890	18,686	13,438	32,124	42	111

Table 2: Expenditure Accounts Project Cost Summary

Eritrea
Fisheries Resources Management Programme (FReMP)
Expenditure Accounts by Years -- Totals Including Contingencies
(US$ '000)

	Totals Including Contingencies							
	PY1	PY2	PY3	PY4	PY5	PY6	PY7	Total
I. Investment Costs								
A. Works	374	3,319	2,658	2,100	1,006	767	54	10,279
B. Vehicles	259	801	172	227	315	302	291	2,367
C. Equipment &Materials	885	2,218	2,505	3,600	430	64	119	9,820
D. Consultancies	-	588	323	147	270	100	39	1,466
E. Training	811	1,144	1,170	564	364	269	508	4,829
Total Investment Costs	2,329	8,070	6,827	6,638	2,385	1,502	1,010	28,761
II. Recurrent Costs								
A. Salaries & Allowances	224	230	237	244	252	259	267	1,713
B. Operating costs	215	222	228	235	242	250	257	1,650
Total Recurrent Costs	439	452	466	480	494	509	524	3,363
Total PROJECT COSTS	2,768	8,522	7,293	7,118	2,879	2,010	1,534	32,124

Table 3: Project Components by Year – Totals Including Contingencies (US $ 000)

Eritrea
Fisheries Resources Management Programme (FReMP)
Project Components by Year -- Totals Including Contingencies
(US$ '000)

	Totals Including Contingencies							
	PY1	PY2	PY3	PY4	PY5	PY6	PY7	Total
A. Develop Sustainable Fisheries Systems								
1. Develop Marine Fisheries Production and Post-Harvest Systems	260	2,492	1,714	1,334	240	-	-	6,040
2. Development and Sustainable Utilization of Inland Fisheries	118	1,049	1,066	798	934	751	4	4,721
3. Market development and Promotion of Fish consumption	-	396	268	173	251	134	301	1,523
Subtotal	378	3,938	3,047	2,306	1,425	885	305	12,284
B. Fisheries Enterprises Support Services								
1. Entrepreneurial Capacity Development	405	486	858	75	6	-	-	1,830
2. Strengthen Input Supply Services	833	1,761	2,454	3,540	318	-	-	8,905
Subtotal	1,237	2,247	3,312	3,615	324	-	-	10,735
C. Institutional Strengthening and Implementation Support								
1. Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector -	314	1,695	272	339	427	402	291	3,738
2. Programme Coordination and Implementation Support Services	839	643	662	858	702	724	938	5,367
Subtotal	1,153	2,338	934	1,197	1,129	1,126	1,229	9,105
Total PROJECT COSTS	2,768	8,522	7,293	7,118	2,879	2,010	1,534	32,124

Table 4: Components by Financiers (US $ 000)

Eritrea
Fisheries Resources Management Programme (FReMP)
Components by Financiers
(US$ '000)

	IFAD		GEF		FAO		Germany		GoE		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Exch.	Taxes)	Taxes
A. Develop Sustainable Fisheries Systems																	
1. Develop Marine Fisheries Production and Post-Harvest Systems	2,757	45.7	2,557	42.3	-	-	26	0.4	194	3.2	504	8.4	6,040	18.8	890	4,955	194
2. Development and Sustainable Utilization of Inland Fisheries	721	15.3	3,951	83.7	-	-	-	-	48	1.0	-	-	4,721	14.7	1,587	3,085	48
3. Market development and Promotion of Fish consumption	1,480	97.2	-	-	-	-	-	-	43	2.8	-	-	1,523	4.7	800	680	43
Subtotal	4,958	40.4	6,508	53.0	-	-	26	0.2	286	2.3	504	4.1	12,284	38.2	3,277	8,720	286
B. Fisheries Enterprises Support Services																	
1. Entrepreneurial Capacity Development	1,702	93.0	128	7.0	-	-	-	-	0	-	-	-	1,830	5.7	732	1,098	-
2. Strengthen Input Supply Services	1,674	18.8	-	-	-	-	5,940	66.7	445	5.0	846	9.5	8,905	27.7	5,340	3,120	445
Subtotal	3,376	31.4	128	1.2	-	-	5,940	55.3	445	4.1	846	7.9	10,735	33.4	6,072	4,218	445
C. Institutional Strengthening and Implementation Support																	
1. Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector -	1,950	52.2	652	17.4	500	13.4	-	-	637	17.0	-	-	3,738	11.6	2,621	481	637
2. Programme Coordination and Implementation Support Services	4,716	87.9	602	11.2	-	-	-	-	50	0.9	-	-	5,367	16.7	1,468	3,850	50
Subtotal	6,666	73.2	1,254	13.8	500	5.5	-	-	686	7.5	-	-	9,105	28.3	4,089	4,331	686
Total PROJECT COSTS	15,000	46.7	7,890	24.6	500	1.6	5,966	18.6	1,417	4.4	1,351	4.2	32,124	100.0	13,438	17,269	1,417

Table 5: Disbursement by semester by Financiers (US $ 000)

Eritrea
Fisheries Resources Management Programme (FReMP)
Disbursements by Semesters and Government Cash Flow
(US$ '000)

	Financing Available						Costs to be Financed	GoE	
	IFAD Amount	GEF Amount	FAO Amount	Germany Amount	Beneficiaries Amount	Total	Project Costs	Cash Flow	Cumulative Cash Flow
1	756	264	-	278	40	1,337	1,384	-47	-47
2	756	264	-	278	40	1,337	1,384	-47	-94
3	2,164	994	50	590	222	4,020	4,261	-241	-335
4	2,164	994	50	590	222	4,020	4,261	-241	-576
5	1,612	803	50	824	231	3,519	3,646	-128	-704
6	1,612	803	50	824	231	3,519	3,646	-128	-831
7	1,198	821	50	1,186	168	3,423	3,559	-136	-967
8	1,198	821	50	1,186	168	3,423	3,559	-136	-1,103
9	615	593	50	106	15	1,379	1,439	-60	-1,163
10	615	593	50	106	15	1,379	1,439	-60	-1,223
11	486	421	50	-	-	957	1,005	-48	-1,271
12	486	421	50	-	-	957	1,005	-48	-1,319
13	669	49	-	-	-	718	767	-49	-1,368
14	669	49	-	-	-	718	767	-49	-1,417
Total	15,000	7,890	500	5,966	1,351	30,707	32,124	-1,417	-1,417

Table 6: Expenditure Accounts by Financiers US$ 000

Eritrea
Fisheries Resources Management Programme (FReMP)
Expenditure Accounts by Financiers
(US$ '000)

	IFAD		GEF		FAO		Germany		GoE		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Exch.	Taxes)	Taxes
I. Investment Costs																	
A. Works	3,367	32.8	6,155	59.9	-	-	26	0.3	227	2.2	504	4.9	10,279	32.0	2,001	8,052	227
B. Vehicles	1,707	72.1	54	2.3	-	-	-	-	605	25.6	-	-	2,367	7.4	1,647	114	605
C. Equipment &Materials	2,206	22.5	353	3.6	-	-	5,929	60.4	487	5.0	845	8.6	9,820	30.6	5,853	3,480	487
D. Consultancies	562	38.3	356	24.3	500	34.1	-	-	48	3.3	-	-	1,466	4.6	1,319	98	48
E. Training	4,187	86.7	629	13.0	-	-	10	0.2	1	-	1	-	4,829	15.0	1,952	2,877	1
Total Investment Costs	12,029	41.8	7,548	26.2	500	1.7	5,966	20.7	1,368	4.8	1,351	4.7	28,761	89.5	12,772	14,621	1,368
II. Recurrent Costs																	
A. Salaries & Allowances	1,370	80.0	343	20.0	-	-	-	-	0	-	-	-	1,713	5.3	171	1,542	-
B. Operating costs	1,601	97.0	-	-	-	-	-	-	50	3.0	-	-	1,650	5.1	495	1,106	50
Total Recurrent Costs	2,971	88.3	343	10.2	-	-	-	-	50	1.5	-	-	3,363	10.5	666	2,647	50
Total PROJECT COSTS	15,000	46.7	7,890	24.6	500	1.6	5,966	18.6	1,417	4.4	1,351	4.2	32,124	100.0	13,438	17,269	1,417

Annex 2: Detailed Cost Tables

Table1.1. Develop Marine Fisheries Production and Post-Harvest Systems

Fisheries Resources Management Programme (FReMP)
Table 1.1. Develop Marine Fisheries production and post-harvest systems
Detailed Costs
(US$)

		Quantities									Totals Including Contingencies ('000)												
	Unit	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	IFAD	GEF	Germany	GoE	Beneficiaries
I. Investment Costs																							
A. Establish ice making facility on 1 fish landing site to support the cold-fish value chain	Lumpsum	-	1	-	-	-	-	-	1	500,000	-	582	-	-	-	-	-	582	464	90	-	29	-
B. Construct solar fish drying facilities on 4 landing sites /a																							
Design and specification	TA	-	1	-	-	-	-	-	1	50,000	-	58	-	-	-	-	-	58	28	-	-	3	28
Construct solar fish drying facilities on 4 landing sites /b	Lumpsum	-	2	2	-	-	-	-	4	200,000	-	466	480	-	-	-	-	946	449	-	-	47	449
Prepare business plan and staff training	TA	-	1	-	-	-	-	-	1	50,000	-	58	-	-	-	-	-	58	28	-	-	3	28
Subtotal											-	582	480	-	-	-	-	1,062	504	-	-	53	504
C. Pilot mobile solar fish dryers (racks and UV-treated solar tents)	Lumpsum	-	1	2	2	-	-	-	5	40,000	-	47	96	99	-	-	-	241	-	229	-	12	-
D. Pilot solar PV fish storage technologies	Lumpsum	-	1	2	2	-	-	-	5	20,000	-	23	48	49	-	-	-	121	-	88	26	6	-
E. Construction of multi-purpose centres /c	Centre	-	1	1	1	-	-	-	3	450,000	-	524	540	556	-	-	-	1,620	1,539	-	-	81	-
F. Ecosystem management in coastal environment																							
Mangrove management /d	ha	260	260	390	390	-	-	-	1,300	1,000	260	260	390	390	-	-	-	1,300	-	1,300	-	-	-
Coastal afforestation	ha	-	40	40	60	60	-	-	200	4,000	-	160	160	240	240	-	-	800	-	800	-	-	-
International exchange visits	group of 10 pax	-	1	-	-	-	-	-	1	50,000	-	50	-	-	-	-	-	50	-	50	-	-	-
Subtotal											260	470	550	630	240	-	-	2,150	-	2,150	-	-	-
G. Pilot mariculture																							
Pilot technologies for 4 species /e	Cost / pilot	-	4	-	-	-	-	-	4	20,000	-	89	-	-	-	-	-	89	84	-	-	4	-
H. Operationalization of Mariculture Research Centre																							
Establishment of hatchery for mariculture	Lumpsum	-	1	-	-	-	-	-	1	75,000	-	87	-	-	-	-	-	87	83	-	-	4	-
Building to house hatchery	Lumpsum	-	1	-	-	-	-	-	1	75,000	-	87	-	-	-	-	-	87	83	-	-	4	-
Subtotal											-	175	-	-	-	-	-	175	166	-	-	9	-
Total											260	2,492	1,714	1,334	240	-	-	6,040	2,757	2,557	26	194	504

\a (Dahlak, Tio, Eddi and 1 other)
\b (Dahlak, Tio, Eddi and 1 other)
\c (CCU store, extension office, Net-making, engine repair, training facility, residence for extension agent]
\d Group managed incl planting, protecting, beekeeping
\e (grouper, mullet, seabream & milkfish etc)

Table1.2. Development and Sustainable Utilization of Inland Fisheries

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 1.2. Development and sustainable utilization of inland fisheries
Detailed Costs
(US$)

		Quantities									Totals Including Contingencies ('000)										
	Unit	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	IFAD	GEF	GoE
I. Investment Costs																					
A. Develop management plans for dam fisheries																					
Stakeholders consultations for management plans	Cost per dam	-	15	-	-	-	-	-	15	2,000	-	33	-	-	-	-	-	33	-	32	2
TA for developing Management Plans of reservoirs and staff training	Management plan	-	3	3	4	5	-	-	15	10,000	-	33	34	47	61	-	-	175	-	166	9
Subtotal											-	67	34	47	61	-	-	208	-	198	10
B. Establish a system for utilization of fisheries in reservoirs																					
Stakeholders meetings	Lumpsum	-	15	-	-	-	-	-	15	2,000	-	33	-	-	-	-	-	33	32	-	2
C. Establish hatchery and laboratory facility in Mai-Sirwa for tilapia and catfish																					
TA - Design, installation & conduct training	Lumpsum	-	1	-	-	-	-	-	1	20,000	-	23	-	-	-	-	-	23	22	-	1
Establish hatchery and laboratory facility in Mai-Sirwa for tilapia and catfish	Facility	-	1	-	-	-	-	-	1	300,000	-	349	-	-	-	-	-	349	332	-	17
Constriction of inland fishery training facility in Mai Sirwa	Facility	-	-	1	-	-	-	-	1	150,000	-	-	180	-	-	-	-	180	171	-	9
Subtotal											-	373	180	-	-	-	-	553	525	-	28
D. Watershed Management in inland reservoirs																					
Watershed management (2) off-farm maintenance /a	ha	500	2,500	3,250	3,250	3,250	3,250	-	16,000	228	114	570	741	741	741	741	-	3,648	-	3,648	-
Guidelines: watershed management and inland fisheries booklet /b	Booklets(x copies)	-	-	-	-	1	-	-	1	50,000	-	-	-	-	50	-	-	50	-	50	-
National exchange visits /c	Group of 10 pax	2	3	4	4	4	4	4	25	1,000	2	3	4	4	4	4	4	25	-	25	-
Operating costs for watershed management	Ls/p.a										2	4	6	6	6	6	-	30	-	30	-
Subtotal											118	577	751	751	801	751	4	3,753	-	3,753	-
E. Pilot aquaculture to enhance inland fisheries production																					
Pond culture at water reservoirs /d	Cost / pond	-	-	10	-	-	-	-	10	2,000	-	-	23	-	-	-	-	23	22	-	1
Cage culture in 2 Dams /e	Cost /cage	-	-	40	-	-	-	-	40	1,500	-	-	69	-	-	-	-	69	65	-	3
Local fish feed production	Cost / year	-	-	1	-	-	-	-	1	8,000	-	-	9	-	-	-	-	9	9	-	0
Support adoption of aquaculture technologies	Cost per group	-	-	-	-	4	-	-	4	15,000	-	-	-	-	73	-	-	73	69	-	4
Subtotal											-	-	101	-	73	-	-	173	165	-	9
Total											118	1,049	1,066	798	934	751	4	4,721	721	3,951	48

\a Mainly maintenance rangeland enclosures; trees; checkdams
\b Simple, illustrated, two (or more) language versions
\c visits between communities
\d 2 dams * 5 ponds @ 2000 = 20,000 USD)
\e 2 dams*20 cages*1500 = 60,000 USD [MMR]

Table1.3: Market Development and Promotion of Fish Consumption

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 1.3. Market development and Promotion of Fish consumption.

Detailed Costs (US$)	Unit	Quantities PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	Totals Including Contingencies ('000) PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Expenditures by Financiers ('000) IFAD	GoE
I. Investment Costs																				
A. Market development																				
Carry out market surveys for improved and new products	Survey	-	-	1	-	1	-	1	3	30,000	-	-	34	-	36	-	39	109	104	5
Laboratory accreditation (Quality Control Laboratory)	Lumpsum	-	1	-	-	-	-	-	1	120,000	-	133	-	-	-	-	-	133	126	7
Training in the areas of food safety and standards and operationalizng QCL	Training	-	1	-	-	-	-	-	1		-	-	-	-	-	-	-	-	-	-
Training in the areas of certification and branding	Training	-	1	-	-	-	-	-	1		-	-	-	-	-	-	-	-	-	-
Fish products development equipment and materials	Cost/ year	-	1	1	1	1	1	2	7	34,000	-	40	41	42	43	45	92	302	287	15
Fish products development operational expenses	Cost/year	-	1	1	1	1	1	2	7	20,000	-	23	24	25	25	26	54	178	169	9
Fish products development training and information dissemination	cost/year	-	-	1	1	1	1	1	5	30,000	-	-	34	35	36	37	39	182	182	0
Nutrition analysis of different foods	Cost/year	-	1	1	1	1	1	2	7	10,000	-	12	12	12	13	13	27	89	84	4
TA for products development and marketing strategy	Cost/year	-	-	1	-	-	-	-	1	15,000	-	-	17	-	-	-	-	17	16	1
Subtotal											-	208	162	114	154	121	250	1 010	969	41
B. Establish an Umbrella Cooperative for Marketing of Small-Pelagic Fisheries																				
Mobilization and awareness creation	Cost per unit	-	-	1	-	-	-	-	1	15,000	-	-	17	-	-	-	-	17	16	1
Facilitate formation of co-operative (Registration, develop bylaws etc.)	Cost per unit	-	-	1	-	-	-	-	1	2,000	-	-	2	-	-	-	-	2	2	0
Capacity building	Cost per unit	-	-	1	-	-	-	-	1	15,000	-	-	17	-	-	-	-	17	16	1
Subtotal											-	-	37	-	-	-	-	37	35	2
C. Nutrition promotion (including awareness Campaign)																				
Training on nutrition for extension staff	Workshop	-	1	-	1	1	-	-	3	10,000	-	11	-	12	12	-	-	35	35	-
Training on household methodologies for extension staff	Training session	-	1	-	1	1	-	-	3	10,000	-	11	-	12	12	-	-	35	35	-
Recipe development including nutritional analysis	Lumpsum	-	1	-	-	-	-	-	1	20,000	-	22	-	-	-	-	-	22	22	-
Nutrition awareness campaign	Lumpsum	-	1	1	1	1	1	1	6	10,000	-	11	11	12	12	12	13	72	72	-
Fish promotion targeting households, schools and hospitals	Lumpsum	-	1	1	-	-	-	-	2	50,000	-	55	57	-	-	-	-	113	113	-
Food survey for nutrition specific indicators, Creation of M&E Assistant	Lumpsum	-	1	-	-	1	-	1	3	30,000	-	33	-	-	36	-	39	108	108	0
Nutrition sensitization workshop and refresher course for MMR staff	Lumpsum	-	1	-	1	1	-	-	3	20,000	-	22	-	24	24	-	-	70	70	-
Mainstreaming nutrition and small scale fisheries at Hirgigo Fisheries Training College (HFTC) and MaiSirwa	Lumpsum	-	1	-	-	-	-	-	1	20,000	-	22	-	-	-	-	-	22	22	-
Total											-	396	268	173	251	134	301	1 523	1 480	43

Table 2.1: Entrepreneurial Capacity Development

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 2.1. Entrepreneurial capacity development
Detailed Costs
(US$)

		Quantities									Totals Including Contingencies ('000)										
	Unit	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	IFAD	GEF	GoE
I. Investment Costs																					
A. Establishment and capacity building of 100 fishing co-operatives for small pelagics - /a																					
Mobilization and awareness creation	Cost per group	25	25	50	-	-	-	-	100	600	16	17	34	-	-	-	-	67	34	34	0
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost per group	25	25	50	-	-	-	-	100	1,000	27	28	57	-	-	-	-	112	56	56	-0
Training in gears & fishing techniques	Cost per group	25	25	50	-	-	-	-	100	1,000	27	28	57	-	-	-	-	112	112	-	-
Training in entrepreneurship and group dynamics	Cost per group	25	25	50	-	-	-	-	100	1,000	27	28	57	-	-	-	-	112	112	-	-
Subtotal											97	100	206	-	-	-	-	402	313	89	-
B. Establishment and capacity building of 120 co-operatives/ enterprise groups /b																					
Mobilization and awareness creation	Cost per group	20	40	60	-	-	-	-	120	500	11	22	34	-	-	-	-	67	67	-	0
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost per group	20	40	60	-	-	-	-	120	1,000	22	44	69	-	-	-	-	134	134	-	0
Training in processing & value addition and quality assurance	Cost per group	20	40	60	-	-	-	-	120	1,000	22	44	69	-	-	-	-	134	134	-	0
Training in entrepreneurship, and group dynamics (1,000 USD per group for 100 groups)	Cost per group	20	40	60	-	-	-	-	120	1,000	22	44	69	-	-	-	-	134	134	-	0
Subtotal											75	155	240	-	-	-	-	471	471	-	0
C. Establishment and capacity building of 2 co-operatives for modern 18-m boat /c																					
Facilitate the formation of co-operatives Facilitate the formation of co-operatives (Registration, develop bylaws and business plans etc.) /d	Cost per group	2	-	-	-	-	-	-	2	5,000	11	-	-	-	-	-	-	11	11	-	0
Training in gears & fishing techniques	Cost per group	2	-	-	-	-	-	-	2	12,000	26	-	-	-	-	-	-	26	26	-	0
Training in entrepreneurship and group dynamics	Cost per group	2	-	-	-	-	-	-	2	5,000	11	-	-	-	-	-	-	11	11	-	0
Subtotal											47	-	-	-	-	-	-	47	47	-	0
D. Formation of 30 additional fishing co-operatives for the large fish /e																					
Mobilization and awareness creation	Cost per group	15	-	15	-	-	-	-	30	2,000	32	-	34	-	-	-	-	67	67	-	0
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost per group	15	-	15	-	-	-	-	30	1,000	16	-	17	-	-	-	-	33	33	-	0
Capacity building (, entrepreneurship, group dynamics)	Cost per group	15	-	15	-	-	-	-	30		-	-	-	-	-	-	-	-	-	-	-
Training in gears & fishing techniques	Cost per group	15	-	15	-	-	-	-	30	1,000	16	-	17	-	-	-	-	33	33	-	0
Training in entrepreneurship and group dynamics	Cost per group	15	-	15	-	-	-	-	30	1,000	16	-	17	-	-	-	-	33	33	-	0
Subtotal											81	-	86	-	-	-	-	166	166	-	0
E. Estabilshment of 5 enterprise groups in fish retailing business based on identified needs /f																					
Mobilization and awareness creation	Cost per group	-	2	3	-	-	-	-	5	8,000	-	18	27	-	-	-	-	45	45	-	0
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost per group	-	2	3	-	-	-	-	5	1,000	-	2	3	-	-	-	-	6	6	-	0
Training in gears & fishing techniques	Cost per group	-	2	3	-	-	-	-	5	1,000	-	2	3	-	-	-	-	6	6	-	0
Training in entrepreneurship and group dynamics	Cost per group	-	2	3	-	-	-	-	5	1,000	-	2	3	-	-	-	-	6	6	-	0
Subtotal											-	24	38	-	-	-	-	62	62	-	0
F. Mobilization and capacity building of 300 foot fishers in ZNRS and SNRS to transit into artisanal fishers organized into 20 co-operatives																					
Needs assessment of foot fishers	Study	-	1	-	-	-	-	-	1	10,000	-	11	-	-	-	-	-	11	6	6	-
Mobilization and awareness creation	Cost per group	5	5	10	-	-	-	-	20	2,000	11	11	23	-	-	-	-	45	22	22	0
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost per group	5	5	10	-	-	-	-	20	1,000	5	6	11	-	-	-	-	22	11	11	0
Training in gears & fishing techniques	Cost per group	5	5	10	-	-	-	-	20	1,000	5	6	11	-	-	-	-	22	22	-	0
Training in entrepreneurship and group dynamics	Cost per group	5	5	10	-	-	-	-	20	1,000	5	6	11	-	-	-	-	22	22	-	0
Subtotal											27	39	57	-	-	-	-	123	84	39	0

Table 2.1: Entrepreneurial Capacity Development Continued...

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 2.1. Entrepreneurial capacity development
Detailed Costs
(US$)

		Quantities									Totals Including Contingencies ('000)										
	Unit	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	IFAD	GEF	GoE
I. Investment Costs																					
G. Capacity building for engine/boat maintenance and net making/repair																					
Capacity building of 14 members of coastal communities for entrepreneurship in boat/engine repair	Cost per group	-	1	-	-	-	-	-	1	30,000	-	33	-	-	-	-	-	33	33	-	-
H. Establishment and capacity building of 6 women enterprise groups on net making/repair - (6 groups each 20 people)																					
Mobilization and awareness creation	Cost per group	-	3	3	-	-	-	-	6	7,000	-	23	24	-	-	-	-	47	47	-	0
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost per group	-	3	3	-	-	-	-	6	2,000	-	7	7	-	-	-	-	14	14	-	-
Training in net making/mending	Cost per group	-	3	3	-	-	-	-	6	2,000	-	7	7	-	-	-	-	14	14	-	-
Training in entrepreneurship and group dynamics	Cost per group	-	3	3	-	-	-	-	6	2,000	-	7	7	-	-	-	-	14	14	-	-
Subtotal											-	43	45	-	-	-	-	88	88	-	0
I. Capacity building of 4 enterprise groups in viable mariculture technologies following pilot - (4 groups of 15 people)																					
Training of enterprise groups in viable mariculture technologies	Cost Per Group	-	-	2	-	2	-	-	4	2,500	-	-	6	-	6	-	-	12	12	-	-
J. Establishment and capacity building of 15 processing/marketing enterprise groups for inland fisheries - (15 groups each 20 people)																					
Establishment and capacity building of 15 processing/marketing enterprise groups for inland fisheries - (15 groups each 20 people)	Facility	7	-	8	-	-	-	-	15	2,000	15	-	18	-	-	-	-	33	33	-	-
Mobilization and awareness creation	Facility	2	5	7	8	-	-	-	22	2,000	4	11	16	19	-	-	-	50	50	-	-
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Facility	2	5	7	8	-	-	-	22	2,000	4	11	16	19	-	-	-	50	50	-	-
Training in net making/mending	Facility	2	5	7	8	-	-	-	22	2,000	4	11	16	19	-	-	-	50	50	-	-
Training in entrepreneurship and group dynamics	Facility	2	5	7	8	-	-	-	22	2,000	4	11	16	19	-	-	-	50	50	-	-
Subtotal											32	44	82	75	-	-	-	234	234	-	-
K. Establishment and capacity building of 45 fishing enterprise groups for inland fisheries - (45 groups each 7 people)																					
Mobilization and awareness creation	Cost Per Group	11	11	23	-	-	-	-	45	800	9	10	21	-	-	-	-	40	40	-	-
Facilitate the formation of co-operatives (Registration, develop bylaws etc.)	Cost Per Group	11	11	23	-	-	-	-	45	1,000	12	12	26	-	-	-	-	50	50	-	0
Training in net making/mending	Cost Per Group	11	11	23	-	-	-	-	45	1,000	12	12	26	-	-	-	-	50	50	-	0
Training in entrepreneurship and group dynamics	Cost Per Group	11	11	23	-	-	-	-	45	1,000	12	12	26	-	-	-	-	50	50	-	0
Subtotal											45	46	100	-	-	-	-	191	191	-	0
Total											405	486	858	75	6	-	-	1,830	1,702	128	0

\a (100 co-operatives each 15 people)
\b For fish preservation, processing, value addition and marketing for small pellagics - (120 co-operative each 15 people)
\c (2 co-operatives each 15 people)
\d Facilitate the formation of co-operatives (Registration, develop bylaws and business plans etc.)
\e (30 co-operatives each 15 people)
\f 5 groups of 5 people

Table 2.2: Strengthen Input Supply Services

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 2.2. Strengthen input supply services

Detailed Costs (US$)	Unit	Quantities PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	Totals Including Contingencies ('000) PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Expenditures by Financiers ('000) IFAD	Germany	GoE	Beneficiaries
I. Investment Costs																						
A. Inputs for 100 fishing co-operatives for small pelagics /a																						
Boats for offshore fishing /b	Boats	10	10	20	40	-	-	-	80	50,000	565	582	1,200	2,471	-	-	-	4,818	906	3,214	241	458
Canoe for inshore fishing /c	Boats	15	15	30	-	-	-	-	60	3,000	51	52	108	-	-	-	-	211	40	141	11	20
Fishing gear for offshore fishing /d	Fishing gear	20	20	40	-	-	-	-	80	700	16	16	34	-	-	-	-	66	12	44	3	6
Fishing gear for inshore fishing /e	Fishing gear	20	20	40	-	-	-	-	80	700	16	16	34	-	-	-	-	66	12	44	3	6
Working capital for offshore fishing	Cost per group	10	10	20	-	-	-	-	40	5,000	57	58	120	-	-	-	-	235	44	157	12	22
Subtotal											704	726	1,495	2,471	-	-	-	5,396	1,014	3,599	270	513
B. Inputs for 120 co-operatives/ enterprise groups for fish preservation, processing, value addition and marketing for small pellagics /f																						
Working capital /g	Cost per group	15	15	30	-	60	-	-	120	3,500	59	61	126	-	267	-	-	514	97	343	26	49
C. Input for 30 additional fishing co-operatives for the large fish - (30 co-operatives each 15 people) /h																						
Boats for large fish /i	Boats	-	5	10	15	-	-	-	30	50,000	-	291	600	927	-	-	-	1,818	342	1,212	91	173
Fishing gear - (1 net per boat for 30 boats)	Fishing gear	15	-	15	-	-	-	-	30	700	12	-	13	-	-	-	-	24	5	16	1	2
Subtotal											12	291	612	927	-	-	-	1,842	346	1,229	92	175
D. Inputs for 5 enterprise groups in fish retailing business based on identified needs																						
Working capital - (for 5 groups @ 3,500 per group) = 17,500 USD	Per group	-	2	3	-	-	-	-	5	3,500	-	8	13	-	-	-	-	21	4	14	1	2
E. Mobilization and capacity building of 300 foot fishers in ZNRS and SNRS to transit into artisanal fishers organized into 20 co-operatives																						
Canoes - (1 canoe per co-operative for 20 co-operatives)	Conoes	5	5	10	-	-	-	-	20	3,000	17	17	36	-	-	-	-	70	13	47	4	7
Fishing gear - (1 gear per canoe for 20 canoes)	Fishing gear	5	5	10	-	-	-	-	20	700	4	4	8	-	-	-	-	16	3	10	1	1
Subtotal											21	21	44	-	-	-	-	86	16	57	4	8
F. Toolkit for engine/boat maintenance and net making/repair																						
Toolkits - (14 toolkits @ 500 per toolkit)	Tool kit	-	7	7	-	-	-	-	14	500	-	4	4	-	-	-	-	8	2	6	0	1
G. Input for 6 women enterprise groups on net making/repair - (6 groups each 20 people)																						
Working capital for 6 groups - (6 groups @ 3,500 USD per group)	Per group	-	3	3	-	-	-	-	6	3,500	-	12	13	-	-	-	-	25	5	17	1	2
H. Input for 4 enterprise groups in mariculture technologies following pilot - (4 groups of 15 people)																						
Input for mariculture for 4 groups	Cost per group	-	-	2	-	2	-	-	4	20,000	-	-	48	-	51	-	-	99	19	66	5	9
I. Input for 15 processing/marketing enterprise groups for inland fisheries - (15 groups each 20 people)																						
Working capital	Cost per group	2	5	8	-	-	-	-	15	3,500	8	20	34	-	-	-	-	62	12	41	3	6
J. Input for 45 fishing enterprise groups for inland fisheries - (45 groups each 7 people)																						
Input for 45 fishing enterprise groups for inland fisheries - (45 groups each 7 people)	Conoes	5	6	11	23	-	-	-	45	3,000	17	21	40	85	-	-	-	163	31	109	8	15
Fishing gear (e.g. nets)	Fishing gear	5	6	11	23	-	-	-	45	2,000	11	14	26	57	-	-	-	109	20	72	5	10
Subtotal											28	35	66	142	-	-	-	271	51	181	14	26
K. Inputs for umbrella co-operative for distribution/marketing small pelagics																						
Fish trucks	Trucks	-	2	-	-	-	-	-	2	150,000	-	349	-	-	-	-	-	349	66	233	17	33
Boats	Boats	-	2	-	-	-	-	-	2	50,000	-	116	-	-	-	-	-	116	22	78	6	11
Working capital	Lumpsum	-	1	-	-	-	-	-	1	100,000	-	116	-	-	-	-	-	116	22	78	6	11
Subtotal											-	582	-	-	-	-	-	582	109	388	29	55
Total											833	1,761	2,454	3,540	318	-	-	8,905	1,674	5,940	445	846

Table 2.2: Strengthen Input Supply Services (continued….)

\a 100 co-operatives each 15 people
\b (2 boats each for 40 co-operatives)
\c (1 canoe each for 60 co-operatives)
\d 1 Purse seine per boat for 80 boats
\e (1 Beach seine per canoe for 60 canoes))
\f (120 co-operative each 15 people)
\g @5 NKF Per Kg w et w eight * 10 Tonnes = (5*10000)/15USD 3,500 USD per group All groups (120*3500) = 420,000 (Stagger by Year)]
\h (5 groups of 5 people)
\i (1 boat per co-operative for 30 co-operatives) = 30 boats @ 50,000 = 1,500,000 USD

Table 3.1: Capacity Building of MMR and Other Implementing Agencies for the Sustainable Development of the Fisheries Sector

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 3.1. Capacity building of MMR and other implementing agencies for the sustainable development of the fisheries sector

Detailed Costs (US$)	Unit	Quantities PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	Unit Cost - Negotiation	Totals Including Contingencies ('000) PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Expenditures by Financiers ('00 IFAD	GEF	FAO	GoE
I. Investment Costs																							
A. Support for facilities, equipment for MMR																							
1. Vehicles, motorcycles, bicycles for MMR																							
Vehicle for MMR (MRRSD - 1, MRDD - 1, Mai-Sirwa - 1)	Vehicles	-	3	-	-	-	-	-	3	40,000	636,000	-	133	-	-	-	-	-	133	93	-	-	40
Maintenance of vehicles (@ 20% of purchase cost	O & M	-	3	3	3	3	3	6	21	8,000	127,200	-	27	27	28	29	30	62	203	142	-	-	61
Motor cycles for Zobas for extension work - 6 zobas @ 4 motorcycles	Motor cycles	-	12	-	-	12	-	-	24	4,000	63,600	-	53	-	-	58	-	-	111	78	-	-	33
Motor cycle operation and maintainence (O&M) 20% of purchase price per year	O & M	12	12	12	12	24	24	24	120	4,000	63,600	52	53	55	56	116	120	123	576	403	-	-	173
Bicycles for fisheries inspectors	bicycles	10	-	-	10	-	-	-	20	300	4,770	3	-	-	4	-	-	-	7	5	-	-	2
Subtotal												55	266	82	88	204	150	185	1,030	721	-	-	309
2. Vehicles and motor cycles for NPCO and ZPCO																							
Vehicles /a	Vehicle	-	7	-	-	-	1	-	8	40,000	636,000	-	311	-	-	-	50	-	360	252	-	-	108
Vehicles operation and maintainence (O&M) 20% of purchase price per year	O & M	7	7	7	7	8	8	8	52	8,000	127,200	60	62	64	66	78	80	82	492	344	-	-	148
Subtotal												60	373	64	66	78	130	82	853	597	-	-	256
3. Equipment for research and fisheries monitoring																							
Canoes for MMR Zoba branches for monitoring inland fisheries - 1 per dam	No	3	3	-	-	-	-	-	6	3,000	47,700	10	10	-	-	-	-	-	21	-	20	-	1
Trailer for towing canoes	No	6	-	-	-	-	-	-	6	3,000	47,700	20	-	-	-	-	-	-	20	-	19	-	1
Subtotal												31	10	-	-	-	-	-	41	-	39	-	2
4. Equipment for Stock Assessment and Monitoring Inland Waters																							
Equipment and gear to strengthen fisheries monitoring in marine, including stock assessment	Lumpsum	-	1	-	-	-	-	-	1	160,000	2,544,000	-	186	-	-	-	-	-	186	-	177	-	9
SCUBA Equipment	SCUBA	5	-	-	-	-	-	-	5	2,000	31,800	11	-	-	-	-	-	-	11	-	11	-	1
Underwater camear	No	1	-	-	-	-	-	-	1	2,000	31,800	2	-	-	-	-	-	-	2	-	2	-	0
Equipment and gear for monitoring inland fisheries and dams water quality	Lumpsum	-	1	-	-	-	-	-	1	40,000	636,000	-	47	-	-	-	-	-	47	-	44	-	2
Subtotal												14	233	-	-	-	-	-	246	-	234	-	12
5. Office equipment for MMR (Mai Sirwa, MRRSD & MRDD)																							
Laptops	Laptos	-	3	-	-	-	-	-	3	1,500	23,850	-	5	-	-	-	-	-	5	3	-	-	1
Desktops	Desktop	-	3	-	-	-	-	-	3	2,000	31,800	-	7	-	-	-	-	-	7	7	-	-	0
Printers/Photocopiers	Printers/Photocopiers	-	3	-	-	-	-	-	3	10,000	159,000	-	35	-	-	-	-	-	35	33	-	-	2
Office Furniture	set	3	-	-	-	-	-	-	3	2,000	31,800	7	-	-	-	-	-	-	7	6	-	-	0
Subtotal												7	47	-	-	-	-	-	54	50	-	-	4

Table 3.1: Continued…

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 3.1. Capacity building of MMR and other implementing agencies for the sustainable development of the fisheries sector

Detailed Costs (US$)	Unit	Quantities PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	Unit Cost - Negotiation	Totals Including Contingencies ('000) PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Expenditures by Financiers ('00 IFAD	GEF	FAO	GoE
I. Investment Costs																							
A. Support for facilities, equipment for MMR																							
6. Audio visual for MMR institutions																							
Still camera (MMR - 2; Mai-Sirwa - 1, HFTC -1)	Still camera	4	-	-	-	-	-	-	4	1,000	15,900	4	-	-	-	-	-	-	4	3	-	-	1
Video Camera (MMR - 2; Mai-Sirwa - 1, HFTC -1)	Video camera	2	2	-	-	-	-	-	4	2,000	31,800	4	4	-	-	-	-	-	9	6	-	-	3
LCD Projector (MMR - 2; Mai-Sirwa - 1, HFTC -1)	Projector	2	2	-	-	-	-	-	4	1,500	23,850	3	3	-	-	-	-	-	7	7	-	-	0
Subtotal												12	8	-	-	-	-	-	20	16	-	-	4
7. Information and data management																							
Strengthening of fisheries database (Relevant hardware and software)	Lumpsum	-	1	-	-	-	-	-	1			-	-	-	-	-	-	-	-	-	-	-	-
Establish information system on Oceanographic and Meteorological factors	Lumpsum	-	1	-	-	-	-	-	1	50,000	795,000	-	55	-	-	-	-	-	55	-	39	-	17
Support Library at HFTC	Lumpsum	-	1	-	-	-	-	-	1	20,000	318,000	-	22	-	-	-	-	-	22	-	16	-	7
Subtotal												-	78	-	-	-	-	-	78	-	54	-	23
8. Office equipment for NPCO																							
Desktops	Desktops	6	-	-	-	6	-	-	12	800	12,720	5	-	-	-	6	-	-	11	11	-	-	0
Office rent	Month	12	12	12	12	12	12	12	84	1,000	15,900	13	13	14	14	15	15	15	99	99	-	-	-
Laptops	Laptops	6	-	6	-	-	-	-	12	700	11,130	5	-	5	-	-	-	-	9	9	-	-	-
Printers/Photopiers	Printers/Photopiers	2	-	-	2	-	-	-	4	10,000	159,000	22	-	-	24	-	-	-	45	45	-	-	0
Office Furniture	SET	6	-	-	6	-	-	-	12	2,000	31,800	13	-	-	14	-	-	-	27	27	-	-	-
Subtotal												57	13	19	52	20	15	15	191	191	-	-	0
9. Office equipment for ZNPO																							
Desktops	Desktops	6	-	-	-	6	-	-	12	800	12,720	5	-	-	-	6	-	-	11	11	-	-	0
Office rent	Month	12	12	12	12	12	12	12	84	500	7,950	6	7	7	7	7	7	8	50	50	-	-	-
Laptops	Laptops	3	3	-	-	-	-	-	6	700	11,130	2	2	-	-	-	-	-	5	5	-	-	-
Printers/Photopiers	Printers/Photopiers	3	3	-	-	-	-	-	6	10,000	159,000	32	33	-	-	-	-	-	66	66	-	-	0
Office Furniture	SET	6	-	-	6	-	-	-	12	2,000	31,800	13	-	-	14	-	-	-	27	27	-	-	-
Subtotal												59	42	7	21	13	7	8	158	158	-	-	0
10. Audio visual for NPCO & ZPCO																							
Still camera (NPCO - 2; Zobas - 6)	No	4	4	-	-	-	-	-	8	1,000	15,900	4	4	-	-	-	-	-	9	6	-	-	3
Video Camera (NPCO - 2; Zobas - 6)	No	4	4	-	-	-	-	-	8	2,000	31,800	9	9	-	-	-	-	-	17	12	-	-	5
LCD Projector (NPCO - 2; Zobas - 6)	No	4	4	-	-	-	-	-	8	1,500	23,850	6	7	-	-	-	-	-	13	9	-	-	4
Subtotal												19	20	-	-	-	-	-	39	28	-	-	12
Subtotal												314	1,090	172	227	315	302	291	2,710	1,760	327	-	622
B. Equipping the monitoring, control and surveillance patrol boat	No	-	1	-	-	-	-	-	1	100,000	1,590,000	-	116	-	-	-	-	-	116	111	-	-	6
C. Technical skills (MMR & Zoba branches)																							
Training of fisheries database (Relevant hardware and software)	Training	-	1	-	-	-	-	-	1	20,000	318,000	-	22	-	-	-	-	-	22	22	-	-	-
Training on asset financing procedures (including loan recovery) to CCU staff in the six Zobas	Lumpsum	-	1	-	1	1	-	-	3	10,000	159,000	-	11	-	12	12	-	-	35	35	-	-	-
TA Stock Assessment including training	Lumpsum	-	1	-	-	-	-	-	1	150,000	2,385,000	-	166	-	-	-	-	-	166	-	158	-	8
Training on MCS	Training	-	1	-	-	-	-	-	1	50,000	795,000	-	55	-	-	-	-	-	55	-	55	-	-
TA for updating Fisheries Management Plan	study	-	1	-	-	-	-	-	1	100,000	1,590,000	-	111	-	-	-	-	-	111	-	111	-	-
TA for operationalization of VMS	STUDY	-	1	-	-	-	-	-	1	20,000	318,000	-	22	-	-	-	-	-	22	22	-	-	-
Subtotal												-	388	-	12	12	-	-	412	79	324	-	8
D. Technical assistance	Lumpsum	-	1	1	1	1	1	-	5	100,000	1,500,000	-	100	100	100	100	100	-	500	-	-	500	-
Total												314	1,695	272	339	427	402	291	3,738	1,950	652	500	637

\a 2 for NPCO and 6 for ZPCO

Table 3.2: Programme Coordination and Implementation Support Services

Eritrea
Fisheries Resources Management Programme (FReMP)
Table 3.2. Programme Coordination and Implementation Support Services
Detailed Costs
(US$)

		Quantities									Totals Including Contingencies ('000)										
	Unit	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	Unit Cost	PY 1	PY2	PY3	PY4	PY5	PY6	PY7	Total	IFAD	GEF	GoE
I. Investment Costs																					
A. Key studies and startup events																					
Startup workshops	Lumpsum	1	-	-	-	-	-	-	1	100,000	108	-	-	-	-	-	-	108	108	-	-
Baseline/preparatory studies	Study	1	-	-	-	-	-	-	1	100,000	108	-	-	-	-	-	-	108	108	-	-
Mid Term Review and Impact assessment	Study	-	-	-	1	-	-	-	1	150,000	-	-	-	176	-	-	-	176	176	-	-
Project Completion and Impact evaluation	Study	-	-	-	-	-	-	1	1	150,000	-	-	-	-	-	-	193	193	193	-	-
Audits	Year	1	1	1	1	1	1	1	7	15,000	16	17	17	18	18	19	19	124	124	-	0
Subtotal											232	17	17	194	18	19	212	708	708	-	0
B. Key Workshops																					
Annual planning workshops at Zobas (6) and national levels (1)	Number	7	7	7	7	7	7	7	49	5,000	38	39	40	41	42	44	45	289	231	58	0
Bi-annual implementation review workshops at Zobas (12) national (2)	Number	14	14	14	14	14	14	14	98	5,000	75	78	80	82	85	87	90	578	462	116	0
Annual stakeholders workshops for Knowledge management at Zoba (6) national level (1) /a	Lumpsum	2	2	2	2	2	2	2	14	5,000	11	11	11	12	12	12	13	83	66	17	0
Annual M&E meetings for M&E officers	Meetings	1	1	1	1	1	1	1	7	2,000	2	2	2	2	2	2	3	17	13	3	0
Subtotal											126	130	134	138	142	146	150	965	772	193	0
C. Knowledge management, learning and dissemination																					
Learning & dissemination	SESSIONS	1	1	1	1	1	1	1	7	10,000	11	11	11	12	12	12	13	83	66	17	0
Production of knowledge materials	Cost per year	1	1	1	1	1	1	1	7	10,000	11	11	11	12	12	12	13	83	66	17	0
South-south cooperation opportunities for knowledge sharing	sessions	1	1	1	1	1	1	1	7	10,000	11	11	11	12	12	12	13	83	66	17	0
Exchange visits	Visits per year	1	1	1	1	1	1	1	7	10,000	11	11	11	12	12	12	13	83	66	17	0
Subtotal											43	44	46	47	48	50	51	330	264	66	0
Total Investment Costs											401	191	196	379	208	215	414	2,004	1,745	259	0
II. Recurrent Costs																					
A. Salaries																					
National Coordinator	Month	12	12	12	12	12	12	12	84	1,000	13	13	14	14	15	15	15	99	79	20	-0
Financial Controller	Month	12	12	12	12	12	12	12	84	700	9	9	10	10	10	10	11	69	55	14	0
Procurement Specialist	Month	12	12	12	12	12	12	12	84	700	9	9	10	10	10	10	11	69	55	14	0
Monitoring and Evaluation (M&E) Specialist	Month	12	12	12	12	12	12	12	84	700	9	9	10	10	10	10	11	69	55	14	0
Monitoring and Evaluation (M&E) Assistant (Knowledge Management)	Month	12	12	12	12	12	12	12	84	500	6	7	7	7	7	7	8	50	40	10	-0
Programme Assistant	Month	12	12	12	12	12	12	12	84	500	6	7	7	7	7	7	8	50	40	10	-0
Zoba Project Coordinator	Month	72	72	72	72	72	72	72	504	700	54	56	58	59	61	63	65	416	333	83	0
Zoba M&E Officer	Month	72	72	72	72	72	72	72	504	500	39	40	41	42	44	45	46	297	238	59	0
Zoba Financial Manager	Month	72	72	72	72	72	72	72	504	500	39	40	41	42	44	45	46	297	238	59	0
Zoba Procurement Officer	Month	72	72	72	72	72	72	72	504	500	39	40	41	42	44	45	46	297	238	59	0
Subtotal											224	230	237	244	252	259	267	1,713	1,370	343	0
B. General operating expenses for NPCO	Per year	1	1	1	1	1	1	1	7	80,000	86	89	91	94	97	100	103	660	660	-	-0
C. General operating expenses for ZPCO	Lumpsum	6	6	6	6	6	6	6	42	20,000	129	133	137	141	145	150	154	990	941	-	50
Total Recurrent Costs											439	452	466	480	494	509	524	3,363	2,971	343	50
Total											839	643	662	858	702	724	938	5,367	4,716	602	50

\a 5000

Appendix 10: Economic and financial analysis

I. Overview

1. From the Economic and Financial Analysis perspective, the Programme is well justified as illustrated in this Appendix. The opportunities are premised around the existence of unpolluted, underexploited and under-capitalized marine environment in an Exclusive Economic Zone (EEZ) of 121 000 km^2 in the Red Sea and the over 330 inland water reservoirs of which 71 have already been stocked with different fish species. The Maximum Sustainable Yield (MSY) of Eritrea Red Sea fisheries has been estimated by several sources at about 80,000 tonnes per year. However, recorded catches rarely exceed 10,000 tonnes, of which less than 2,000 tonnes is from artisanal fisheries. There is evidence from numerous stock assessments that the MSY for the small pelagic fish (anchovies and sardines) is about 50,000 tonnes per year. In spite of all this potential, the fisheries sector contributes about 3% of the country's GDP.

2. The Programme will provide direct support to:

- inland fishing groups/cooperatives (# 15);
- small pelagic fishing cooperatives (# 200 off-shore and 55 near-shore);
- fish value addition enterprises (fish drying- 120#));
- fish mongers/traders (#75-80);
- Fish marketing and provision of key inputs through the CCU and establishment of a sustainable ice plant; and
- Mangrove management or generally Natural Resource Management (NRM) complimentary activities.

3. Expected benefits include:

- Increases in production and quality of marketable fish (about 19,125 tonnes for small pelagic fish and about 100 tonnes fresh water fish from selected inland fishing on selected water reservoirs);
- Higher prices to producers and, at the same time, traders due to fish consumption promotion campaigns, aggregation of fish products and improving the market processes. For instance, price of processed/dried fish for human consumption is projected to double to ERN 70 as a result of fish consumption promotion campaigns that should result in increased aggregate demand.
- increased community level resource rental revenues (Fishers on inland water reservoirs will be charged a resource rental initially estimated at ERN 5/Kg);
- Consumer benefit through availability fish products (improved nutrition levels) at fair prices through reduced inefficiencies along the market chain; and
- Besides the benefits related to the increase in landed and processed fish volumes, the investment in the mangrove forests will offer opportunities for small-scale cottage industries, such as honey production. Under Natural Resources management, each household is associated with about 1.34 hectares of natural resources rehabilitation (17,000 ha and 12,646 households). A 5-bee hive unit has been assumed for each household with annual gross margin of about ERN 4,300.

4. Financial Analysis – A comprehensive set of financial analyses of the Programme's different investment activities has been undertaken. The analysis of the smallholder enterprise models is developed by building financial budgets and deriving selected financial performance indicators that will be used to examine the impact of Programme interventions on targeted smallholder enterprises and households. Prices of inputs and outputs, as well as all technical parameters used to build the financial models, were derived from information obtained during the design Missions and discussions with entrepreneurs and other relevant stakeholders in the fisheries sector.

5. The following representative models have been used in the FReMP financial and economic analysis. For each model, the financial budgets are presented showing the overall profitability. An economic budget is then presented using shadow prices where the Conversion Factor (CF) is not equal to 1. Finally, at the end of each of model, aggregation is presented and the economic benefits are presented to be used later on in the overall FReMP aggregation.

Small Pelagic fish	• Fishing co-operatives for small pelagic • Fish processing/value addition co-operatives/ enterprise groups • Fish retailing • Employment from supportive services, such as boat repairs and net making
Inland Fishing	• Fishing enterprise groups in dams.

6. A target of 19,125 tonnes per year (end target) has been estimated through 255 small pelagic fishing cooperatives (75t/cooperative/year). This will be through both offshore and near shore (beach seine units). Financial models presented in this Appendix show that the percentage change in annual net income of artisanal fishers by mid-term would increase by 530%. Production itself is targeted to increase from a baseline of 1,875 tonnes to 19,125 tonnes (920%). It is projected that about 100 tonnes of fish per year will be produced from the 15 water reservoirs supported by FReMP. The 71 stocked dams in the country can produce approximately 350 tonnes of fish per year.

7. ***Beneficiaries*** – In total, FReMP is targeting 17,500 households (87,500 people) through 600 groups. The cost per beneficiary is USD 361 (about USD 1,800 per household; assuming that, on the average, a household consists of five people).

8. Given this level of benefits to the target group, it is not surprising that the Programme will also generate a high economic rate of return (ERR) – estimated to be around 17%over a 10-year period. It is emphasised, however, that this is a minimum because it only considers the economic benefits related to frontline production/processing. There are many other complementary activities that will generate benefits beyond the above front line production/trading activities. These include the improved nutrition and Capacity Building of MMR Staff and the resultant policy changes that have not been included in the analysis because of estimation difficulties.

II. Fish Demand/Marketability of Outputs

9. The end target of 19,125 tonnes of landed small pelagic fish translates to a processed dry weight of about 3,000 tonnes (assuming an average conversion ratio (wet weight to dry weight) of about 6:1). From the inland water reservoirs, a target of fresh fish of 100 tonnes has been estimated as an end target. With a population of about 3.65 million and an improved retailing network, domestic demand is more than enough to dispose of the 3,000 tonnes of processed fish per annum and the incremental fresh fish from the inland reservoirs, provided fish consumption is promoted.

10. Under FReMP, there is significant provision to promote fish consumption. Fish consumption in Eritrea is far below other coastal African countries. The per capita fish consumption was estimated at 0.4 Kg in 2011, compared to 9.6 kg for Africa and 18.5 kg for the world average. Overall fish provided 0.2 grams of protein per capita per day in Eritrea, making up 2.5 percent and 0.3 percent of animal feed and total protein respectively. The low fish consumption is attributed to inconsistent supply of fish, leaving most of the population to rely on livestock for their animal protein.

11. The Government decided to promote fish consumption by establishing fish retail outlets in the large towns; the promotion campaign also included the establishment of seafood restaurants that are able to provide different recipes. Some effort has also been devoted in promotion of consumption of small pelagic fish. These measures have had some success and the demand for fish has been rising. Quite often, there will be people queuing to buy fish in the retail outlets when fish is available.

12. ***Marketing Infrastructure***: NFC distributes the large fish through its subsidiaries largely to the main towns across the country. It has specialized refrigerated trucks for transporting fish. In Massawa, Assab, Keren and Asmara, the Government has constructed public wholesale/retail fish markets, while in other towns consumers buy fish directly from the refrigerated trucks. In Asmara, there are seven privately owned retail outlets, comprising fresh fish shops and sea fish restaurants, with all their fish supply coming from NFC. There is a gradual development in domestic marketing systems with an

effort being made by MMR to promote local and external markets and fish consumption by participating in fish shows and other related exhibitions.

13. The NFC does not deal in small pelagic fish. A major limitation in the dry fish production and market linkages is the lack of an institutional set up for distribution and marketing of the small pelagic fisheries in the country. The private sector may not be well equipped and have the skills to fill this gap in the short term. The FReMP design has made provision for the formation of an umbrella cooperative whose primary membership will be individual fish processing cooperatives and enterprise groups.

14. ***Export market***: Export and imports of fish and fishery products is rather limited, with imports estimated at USD 200,000 and exports at USD 7,000 in 2012. The main imports include small and large pelagic fish, such as sardines, anchovies, herrings and tunas, as well as salmon, trout, bonitos lobsters and fresh-water crustaceans. The main export markets for Eritrea's fisheries include Europe, Egypt and Asia where fish species, including snapper, grouper, Spanish mackerel and jack tunas as well as sea cucumbers from the Red Sea are sent. Most of these are fish captured by the licensed foreign fishing vessels, as the country presently does not have a fish quality assurance laboratory accredited for fish exports. The recent improvements in infrastructure have increased Eritrea's export potential, particularly to European Union countries. These include upgrading landings and processing facilities, the construction of the Massawa international airport and the redevelopment of Massawa Port. In 2011, it was announced by the head of the Eritrean Free Zone Authority that a new and modern regional port will be constructed in Massawa.

III. Analysis of the Small Pelagic Fish Production and Market Linkages

A. Small pelagic fishing cooperatives (#255)

15. ***Estimate of production figures***: A target of 19,125 tonnes per year (end target) has been estimated through 255 small pelagic fishing cooperatives (75t/cooperative/year). This will be through both offshore and near shore (beach seine units).

Table 1: Small pelagic fish production end-target:

tonnes	**Catch/day**	**Days/trip**	**Catch/trip**	**Trips/month**	**Catch/month**	**Fishing months in a year**	**Annual offshore & Beach Seine**
Offshore/ near shore	0.375	5	1.875	5	9.375	8	75
Number of cooperatives (end-target)							255
Total estimated production level (end-target)							**19,125**

16. The production potential is projected to reach the end target of 19,125t (75 t per cooperative) progressively as follows:

Table 2: Gradual attainment of end target catch-level

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Progressive catch level per cooperative	60	65	75	75	75	75	75	75	75	75
New cooperatives by year	55	35	65	70	0	0	0	0	0	0

17. The related physical quantities (outputs and inputs), including the required capital investment and operating costs needed to generate the target catch level in table 2 above, are projected in table 3 below:

Table 3: Physical quantities (outputs and inputs) for one small pelagic fishing cooperative

Item	Unit	Financial Unit Prices ERN	Econmic Unit Prices ERN	Without Project	With Project Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production														
Annual catch level	Kg	6	6	9,375	60,000	65,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
Inputs														
Investments (CAPEX)														
Boat- Large	ls	750,000	750,000		1									
Small boat	ls	150,000	150,000		1									
Fishing net	ls	10,000	10,000		1									
Operating expenses														
Fuel	Liter	40	40		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Ice	Kg	0.10	1.00	9,375	30,000	32,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
Food	per trip	300	300	-	80	80	80	80	80	80	80	80	80	80
Labor	days	60	48	480	960	960	960	960	960	960	960	960	960	960
Operation and maintenance costs (10%)	p.a	91,000	91,000		1	1	1	1	1	1	1	1	1	1

18. ***Financial budget*:** Multiplying the financial prices and quantities in table 3 above yields the financial budget for one small pelagic fishing cooperative shown in table 4 below.

Table 4: Financial budget for one small pelagic fishing cooperative

Financial Budget (ERN)

	Without Project	With Project									
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Annual catch level	56,250	360,000	390,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Sub-total Revenues	56,250	360,000	390,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Inputs											
Operating											
Fuel	-	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Ice	938	3,000	3,250	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Food	-	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
labour	28,800	57,600	57,600	57,600	57,600	57,600	57,600	57,600	57,600	57,600	57,600
Operation and maintenance costs (10%)	-	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000
Sub-total Operating Costs	29,738	255,600	255,850	256,350	256,350	256,350	256,350	256,350	256,350	256,350	256,350
Total Production Costs	29,738	255,600	255,850	256,350	256,350	256,350	256,350	256,350	256,350	256,350	256,350
Gross Income	26,513	104,400	134,150	193,650	193,650	193,650	193,650	193,650	193,650	193,650	193,650
Investments		910,000									
Net cash flow (before financing)	-	832,113	107,638	167,138	167,138	167,138	167,138	167,138	167,138	167,138	167,138
NPV @10% (ERN)	69,404.94										
IRR	12.2%										
Benefit/Cost Ratio	1.76										2

19. Table 4 above shows that a small pelagic fishing cooperative has the potential to generate a positive NPV of ERN 69,000 and positive financial rate of return of 12.2 %. The percentage change in annual net income of artisanal fishers by mid-term would increase by 530% (also the end-target increase). Production itself is targeted to increase from a baseline of 1,875 tonnes to 19,125 tonnes (920%).

20. ***Economic Budget*:** In generating economic budgets, financial prices have been converted to economic prices where necessary. In the case of the small pelagic fishing, shadow pricing has been applied to ice, which is highly subsidised in Eritrea and a Conversion Factor (CF) of up to 10 times has been applied. For Labour costs, a CF=0.8 has been applied. A comparison of financial and economic prices is presented in table 5.

Table 5: Economic budget for one small pelagic fishing cooperative

Economic Budget (ERN)

	Without Project	With Project									
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Annual catch level	56,250	360,000	390,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Sub-total Revenues	56,250	360,000	390,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Inputs											
Operating											
Fuel	-	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Ice	9,375	30,000	32,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
Food	-	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
labour	23,040	46,080	46,080	46,080	46,080	46,080	46,080	46,080	46,080	46,080	46,080
Operation and maintenance costs (10%)	-	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000	91,000
Sub-total Operating Costs	32,415	271,080	273,580	278,580	278,580	278,580	278,580	278,580	278,580	278,580	278,580
Total Production Costs	32,415	271,080	273,580	278,580	278,580	278,580	278,580	278,580	278,580	278,580	278,580
Gross Income	23,835	88,920	116,420	171,420	171,420	171,420	171,420	171,420	171,420	171,420	171,420
Incremental economic benefits (WP less WOP)		65,085	92,585	147,585	147,585	147,585	147,585	147,585	147,585	147,585	147,585

21. ***Aggregation of economic benefits*:** From the incremental economic benefits presented in table 5 above and the cascading number of small pelagic fishing cooperatives by year, the aggregated economic benefits are presented in table 6 below:

Table 6: Aggregate economic benefits from all the small pelagic fishing cooperatives

Fishing co-operatives for small pelagic fish		Y1	Y2	Y3	Y4	Y5+	Y6	Y7	Y8	Y9	Y10
Number of Groups/ cooperatives		55	35	35	35	95					
Cascading number of groups/ Cooperatives	Progressive incremental benefits (ERN)										
		Y1	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**
Groups in their year 1	65,085	55	35	35	35	95	-	-	-	-	-
Groups in their year 2	92,585	-	55	35	35	35	95	-	-	-	-
Groups in their year 3	147,585	-	-	55	35	35	35	95	-	-	-
Groups in their year 4+	147,585	-	-	-	55	35	35	35	95	-	-
Aggregated benefits from Small Pelagic fishing (ERN'M)											
Groups in their year 1		4	2	2	2	6	-	-	-	-	-
Groups in their year 2		-	5	3	3	3	9	-	-	-	-
Groups in their year 3		-	-	8	5	5	5	14	-	-	-
Groups in their year 4		-	-	-	8	5	5	5	14	-	-
Groups in their year 5		-	-	-	-	8	5	5	5	14	-
Groups in their year 6		-	-	-	-	-	8	5	5	5	14
Groups in their year 7		-	-	-	-	-	-	8	5	5	5
Groups in their year 8		-	-	-	-	-	-	-	8	5	5
Groups in their year 9		-	-	-	-	-	-	-	-	8	5
Groups in their year 10		-	-	-	-	-	-	-	-	-	8
Total benefits (ERN'Millions)		***4***	***7***	***14***	***19***	***28***	***32***	***38***	***38***	***38***	***38***

22. ***Aggregation of production tonnage***: The small pelagic fish production volumes will progressively reach the end target of 19,125t (mid-term target of 17,000t). This is estimated from the gradual increase in catch level and number of Cooperatives as per their respective age maturities.

Table 7: Aggregate small pelagic fish production targets by year

	Catch level per Cooperative/ tonnes	**Number of active Cooperatives**									
		PY1	**PY2**	**PY3**	**PY4**	**PY5**	**PY6**	**PY7**	**PY8**	**PY9**	**PY10**
Groups in their year 1	60	55	35	35	35	95	-	-	-	-	-
Groups in their year 2	65		55	35	35	35	95				
Groups in their year 3	75			55	35	35	35	95			
Groups in their year 4+	75				55	35	35	35	95		
Progressive catch level- tonnes		60	65	75	75	75	75	75	75	75	75
		Total production by year tonnes									
		PY1	**PY2**	**PY3**	**PY4**	**PY5**	**PY6**	**PY7**	**PY8**	**PY9**	**PY10**
Groups in their year 1		3,300	2,100	2,100	2,100	5,700	-	-	-	-	-
Groups in their year 2		-	3,575	2,275	2,275	2,275	6,175	-	-	-	-
Groups in their year 3		-	-	4,125	2,625	2,625	2,625	7,125	-	-	-
Groups in their year 4		-	-	-	4,125	2,625	2,625	2,625	7,125	-	-
Groups in their year 5		-	-	-	-	4,125	2,625	2,625	2,625	7,125	-
Groups in their year 6							4,125	2,625	2,625	2,625	7,125
Groups in their year 7								4,125	2,625	2,625	2,625
Groups in their year 8									4,125	2,625	2,625
Groups in their year 9										4,125	2,625
Groups in their year 10										-	4,125
Total catch level- wet weight		3,300	5,675	8,500	11,125	17,350	18,175	19,125	19,125	19,125	19,125
Estimate of dried fish- dry weight (15% of wet weight)		495	851	1,275	1,669	2,603	2,726	2,869	2,869	2,869	2,869

23. ***Marketing of the small pelagic fish (end-target 19,125t wet weight)*:** The artisanal fishing cooperatives will have assured market given the fish processing capacity that FReMP will support. The 19,125t quantity of fish that will be landed will feed into the FReMP supported processing capacity.

Projection of demand for small pelagic fish to feed into processing capacity to be generated under FReMP

- FReMP targets establishment of 120 fish processing enterprise groups, each of 15 people (1,800 individuals).
- Each individual processor can handle an average 10 Kg of dried fish per day working for 250 days per year (10 Kg per day per individual for 250 days gives 2.5 tonnes per year).
- For 1,800 fish processing individuals each able to handle 2.5 tonnes per year gives aggregate capacity of 4,500 tonnes per year (dry-weight).
- Dried fish is usually 15% weight of wet fish. Therefore, the 19,125 tonnes landed fish wet weight translates into the less than 4,500 tonnes of dried fish a year processing capacity. This means that if the artisanal fishers land 19,125 tonnes of fish, then the processing groups established under the Programme will safely handle it with minimal post-harvest losses.

B: Fish Processing Cooperatives (#120)

24. The Programme targets establishment of 120 fish processing enterprise groups, each of 15 people (1,800 individuals). These will be processing the landed tonnage of small pelagic fish as projected above. As demonstrated above, each individual can processes 2.5 tonnes a year which translates into 37.5 t/year for a 15 member group.

25. However, the 37.5 t may not be achieved right from the first year of operations of the cooperative. For a prudent analysis, this target has been scaled down to Y1: 18.5t, Y2: 26.25t and Y3: 37.5t/. The related physical quantities (outputs and inputs) including the required capital investment and operating costs are projected as follows for a 15 member group.

Table 8: Physical quantities (Outputs and inputs) for one fish drying cooperative

Item	Unit	Financial Unit Prices ERN	Econmic Unit Prices ERN	Without Project	With Project									
					Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production														
Dried fish- dry weight	Kg	58	58	0	18,750	26,250	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
Provision unskilled Labour (wop)	Per Day	60	48	4500										
Inputs														
Investments (CAPEX)														
Solar tent and related drying elements	ls		120000		1									
Operating														
Fish purchases- wet weight (dry weight/0.15)	Kg	6	6		125,000	175,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Water	Lites	0.10	0.10		125,000	175,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Packaging	per 50 Kg bag	5	5		375	525	750	750	750	750	750	750	750	750
Labour/a	labour	60	48		3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Operation and manintainence (10%)	p.a	12000	12000		1	1	1	1	1	1	1	1	1	1

26. ***Financial Budget*:** Multiplying the financial prices and quantities in table 8 above, yields the financial budget for one fish drying cooperative shown in table 9 below.

Table 9: Financial budget for one fish drying cooperative

Financial Budget (ERN)

	Without Project	With Project									
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Dried fish- dry weight	0	1,087,500	1,522,500	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000
Provision unskilled Labour (wop)	270000	-	-	-	-	-	-	-	-	-	-
Sub-total Revenues	270000	1,087,500	1,522,500	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000
Inputs											
Operating											
Fish purchases- wet weight (dry weight/0.15)	0	750,000	1,050,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Water	0	12,500	17,500	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Packaging	0	1,875	2,625	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Labour/a	0	225,000	225,000	225,000	225,000	225,000	225,000	225,000	225,000	225,000	225,000
Operation and manintainence (10%)	0	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Sub-total Operating Costs	0	1,001,375	1,307,125	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750
Total Production Costs	0	1,001,375	1,307,125	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750	1,765,750
Gross Income	270000	86,125	215,375	409,250	409,250	409,250	409,250	409,250	409,250	409,250	409,250
Investments		120,001									
Net cash flow (before financing)	-	303,876	- 54,625	139,250	139,250	139,250	139,250	139,250	139,250	139,250	139,250
NPV @10% (ERN)	292,562										
IRR	26.9%										
Benefit/Cost Ratio	1.2										1

27. Table 9 above shows that a fish drying cooperative has the potential to generate a positive NPV of ERN 0.29 million and positive financial rate of return of 26.9 %. The percentage change in annual net income of fish processors would increase by 52% (mid-term and end target).

28. ***Economic Budget*:** In the case of the fish processing drying, shadow pricing has been applied to labour where CF=0.8 has been applied. A comparison of financial and economic prices is presented in table 7 which shows that for other items CF=1.

Table 10: Economic budget for one fish drying cooperative

Economic Budget (ERN)

	Without Project	With Project									
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Dried fish- dry weight	0	1,087,500	1,522,500	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000
Provision unskilled Labour (wop)	216000	-	-	-	-	-	-	-	-	-	-
Sub-total Revenues	216000	1,087,500	1,522,500	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000	2,175,000
Inputs											
Operating											
Fish purchases- wet weight (dry weight/0.15)	0	750,000	1,050,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Water	0	12,500	17,500	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Packaging	0	1,875	2,625	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Labour/a	0	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000
Operation and manintainence (10%)	0	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Sub-total Operating Costs	0	956,375	1,262,125	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750
Total Production Costs	0	956,375	1,262,125	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750	1,720,750
Gross Income	216,000	131,125	260,375	454,250	454,250	454,250	454,250	454,250	454,250	454,250	454,250
Incremental economic benefits (WP less WOP)	-	84,875	44,375	238,250	238,250	238,250	238,250	238,250	238,250	238,250	238,250

29. ***Aggregation of economic benefits*:** From the incremental economic benefits presented in table 9 above and the cascading number of fish processing cooperatives by year the aggregated economic benefits are presented in table 11 below:

Table 11 Aggregate economic benefits from all the targeted fish processing cooperatives

Fish processing/ drying											
Number of Groups/ cooperatives		13	37	37	27	7					
Cascading number of groups/ Cooperatives											
	Progressive incremental benefits (ERN)	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**
Groups in their year 1	- 84,875	13	37	37	27	7					
Groups in their year 2	44,375		13	37	37	27	7				
Groups in their year 3	238,250			13	37	37	27	7			
Groups in their year 4+	238,250				13	37	37	27	7		
Aggregated benefits from fish processing		-	-	-	-	-	-	-	-	-	-
Groups in their year 1		- 1	- 3	- 3	- 2	- 1	-	-	-	-	-
Groups in their year 2		-	1	2	2	1	0	-	-	-	-
Groups in their year 3		-	-	3.18	8.74	8.74	6.35	1.59	-	-	-
Groups in their year 4		-	-	-	3.18	8.74	8.74	6.35	1.59	-	-
Groups in their year 5		-	-	-	-	3.18	8.74	8.74	6.35	1.59	-
Groups in their year 6		-	-	-	-	-	3.18	8.74	8.74	6.35	1.59
Groups in their year 7		-	-	-	-	-	-	3.18	8.74	8.74	6.35
Groups in their year 8		-	-	-	-	-	-	-	3.18	8.74	8.74
Groups in their year 9		-	-	-	-	-	-	-	-	3.18	8.74
Groups in their year 10		-	-	-	-	-	-	-	-	-	3.18
Economic benefits from fish processing (ERN' millions)		***(1.13)***	***(2.52)***	***1.69***	***11.28***	***21.27***	***27.30***	***28.59***	***28.59***	***28.59***	***28.59***

30. ***Marketing of the processed/dried fish*:** The fish processing groups will have assured market given the fish traders and fish consumption campaigns that FReMP will support. Awareness campaigns will aim at sensitization, behaviour change communication to create awareness, educate and inform on the important nutritional quality of fish with emphasis on the small pelagic fish consumption. The 3,000t quantity of processed fish will be disposed of through the following trading network of 1,800 retailers to be supported under FReMP. With a population of 3.65 million and an improved retailing network, domestic demand is more than enough to dispose of 3,000t of dry fish per annum.

C: Fish Trading

31. To dispose of the 3,000t of processed fish per annum through a retailing network will require 80 retailing individuals with a daily capacity to sell 25kg of dry fish working 250 days a year. A capital of only ERN 100,000 will enable the individual to get started. What will be needed are basically a weighing scale and some simple equipment. An individual in a small township will be able to dispose of 25Kg per day of dried fish working for at least 250 days a year (6.25t a year). The key physical inputs and outputs for this kind of business unit would be as follows:

Table 12: Physical quantities (outputs and inputs) for a fish retailing individual

Item	Unit	Financial Unit Prices ERN	Econmic Unit Prices ERN	Without Project	With Project Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production														
Dried fish- dry weight	Kg	58	58	0	18,750	26,250	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
Provision unskilled Labour (wop)	Per Day	60	48	4500										
Inputs														
Investments (CAPEX)														
Solar tent and related drying elements	ls		120000		1									
Operating														
Fish purchases- wet weight (dry weight/0.15)	Kg	6	6		125,000	175,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Water	Lites	0.10	0.10		125,000	175,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Packaging	per 50 Kg bag	5	5		375	525	750	750	750	750	750	750	750	750
Labour/a	labour	60	48		3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Operation and manintainence (10%)	p.a	12000	12000		1	1	1	1	1	1	1	1	1	1

32. ***Financial budget*:** Multiplying the financial prices and quantities in table 12 above yields the financial budget for one fish drying cooperative shown in table 13 below.

Table 13: Financial budget for a fish trader

Financial Budget (ERN)

	Without Project	With Project Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Dried fish	0	294,000	378,000	420,000	437,500	437,500	437,500	437,500	437,500	437,500	437,500
Unskilled Labour	15000	-	-	-	-	-	-	-	-	-	-
Sub-total Revenues	15000	294,000	378,000	420,000	437,500	437,500	437,500	437,500	437,500	437,500	437,500
Inputs											
Operating											
Purchase of dried fish	0	243,600	313,200	348,000	362,500	362,500	362,500	362,500	362,500	362,500	362,500
Rent	0	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Labour	0	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Operatio and maintenance (5%)	0	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Sub-total Operating Costs	0	274,600	344,200	379,000	393,500	393,500	393,500	393,500	393,500	393,500	393,500
Total Production Costs	0	274,600	344,200	379,000	393,500	393,500	393,500	393,500	393,500	393,500	393,500
Gross Income	15000	19,400	33,800	41,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000
Investments		100,000									
Net cash flow (before financing)	-	95,600	18,800	26,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
NPV @10% (ERN)	54,236										
IRR	23.2%										
Benefit/Cost Ratio	1.1										1

33. Table 13 above shows that a fish trader has the potential to generate a positive NPV of ERN 54,000 and positive financial rate of return of 23.2%. The percentage change in annual net income of fish processors would increase by 193% (mid-term and end target).

34. **Economic Budget:** In the case of the fish trading, shadow pricing has been applied to labour (CF=0.8) has been applied. A comparison of financial and economic prices is presented in table 12 which shows that for other items CF=1.

Table 14: Economic budget for a fish trader

Economic Budget (ERN)

	Without Project	With Project									
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Dried fish	-	294,000	378,000	420,000	437,500	437,500	437,500	437,500	437,500	437,500	437,500
Unskilled Labour	12000	-	-	-	-	-	-	-	-	-	-
Sub-total Revenues	12000	294,000	378,000	420,000	437,500	437,500	437,500	437,500	437,500	437,500	437,500
Inputs											
Operating											
Purchase of dried fish	0	243,600	313,200	348,000	362,500	362,500	362,500	362,500	362,500	362,500	362,500
Rent	0	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Labour	0	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Operatio and maintenance (5%)	0	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Sub-total Operating Costs	0	271,600	341,200	376,000	390,500	390,500	390,500	390,500	390,500	390,500	390,500
Total Production Costs	0	271,600	341,200	376,000	390,500	390,500	390,500	390,500	390,500	390,500	390,500
Gross Income	12,000	22,400	36,800	44,000	47,000	47,000	47,000	47,000	47,000	47,000	47,000
Incremental economic benefits (WP less WOP)		10,400	24,800	32,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000

35. ***Aggregation of economic benefits*:** From the incremental economic benefits presented in table 13above and the cascading number of fish traders by year, the aggregated economic benefits are presented in table 15 below:

Table 15: Aggregate economic benefits from all the targeted fish trader

Fish Retailing											
No of fish retailers		20	20	20	20						
Cascading number of fish traders											
	Progressive incremental benefits (ERN)	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**
Traders in their year 1	10,400	20	20	20	20	-	-	-	-	-	-
Traders in their year 2	24,800		20	20	20	20	-				
Traders in their year 3	32,000			20	20	20	20	-			
Traders in their year 4+	35,000				20	20	20	20	-		
Progressive incremental benefits		- 99,150	14,800	22,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Phased benefits		-	-	-	-	-	-	-	-	-	-
Beneficiaries in their year 1		0.21	0.21	0.21	0.21	-	-	-	-	-	-
Beneficiaries in their year 2		-	0.50	0.50	0.50	0.50	-	-	-	-	-
Beneficiaries in their year 3		-	-	0.64	0.64	0.64	0.64	-	-	-	-
Beneficiaries in their year 4		-	-	-	0.70	0.70	0.70	0.70	-	-	-
Beneficiaries in their year 5		-	-	-	-	0.70	0.70	0.70	0.70	-	-
Beneficiaries in their year 6		-	-	-	-	-	0.70	0.70	0.70	0.70	-
Beneficiaries in their year 7		-	-	-	-	-	-	0.70	0.70	0.70	0.70
Beneficiaries in their year 8		-	-	-	-	-	-	-	0.70	0.70	0.70
Beneficiaries in their year 9		-	-	-	-	-	-	-	-	0.70	0.70
Beneficiaries in their year 10		-	-	-	-	-	-	-	-	-	0.70
Sub-total Total incremantal income from fish trading- ERN millions		***0.21***	***0.70***	***1.34***	***2.04***	***2.54***	***2.74***	***2.80***	***2.80***	***2.80***	***2.80***

IV. Analysis of the Inland Fishing

36. The inland fisheries is based entirely on artificial water resources since Eritrea has no perennial rivers, natural lakes or other permanent fresh water bodies. About 330 water reservoirs and dams have been constructed in both highland and lowland parts of the country, principally for irrigation and water supply for domestic needs (30,000 m³ to 70,000,000 m³ installed capacity). About 71 of Eritrea's

water reservoirs are stocked with fish species; the fish have been introduced at different times over the past seven decades. FReMP will however support only 15 selected water reservoirs.

37. The Ministry of Marine Resources, through the Zoba branches, has been monitoring fisheries status in the water reservoirs. The results are very encouraging, showing that some species are established and reproducing well. In particular, tilapia and carps seem to be dominant in most dams while cat fish is significant. For instance, a trial catch assessment (not based on probability sampling) done by MMR Zoba Anseba in 2011 realized a total catch of 550 kg of fish from 3 Elabered Dams in 3 days, consisting of tilapia, carp and catfish. More revealing was the sizes of fish existing in the dams, with the largest size of catfish caught weighing 7.1 Kg, tilapia 1.5 Kg and Carp 2.1 Kg.

38. A more recent assessment of 20 reservoirs stocked with different species indicated an average water surface area of 24.5 ha per dam and mean potential yield of 50.6 Kg/ha/year. This production level is quite consistent with the average yields of other water reservoirs in Africa that are subject to moderate to heavy fishing activity. The average yield for large African reservoirs is reported as 27-65 kg/ha/year, while medium-sized reservoirs have a mean yield of approximately 80 kg/ha/year. A mean yield of 50.6 Kg/ha/year will therefore produce approximately 4.9 tons from an average dam per year

39. On average, the 15 dams selected for the Programme can produce at least 74 tons of fish per year. However, the Programme will give priority to those dams with higher potential for fisheries (a key selection criterion for dams under the Programme) and yields can be increased further through improved dam management. Therefore, conservative estimates of 100 tons per year from the Programme intervention dams is realistic with intensification of dam management (target average per dam of 6.7 tonnes/ year).

40. A typical dam will be about 25 ha and as discussed above an annual catch level of 6.7 tonnes/ year is a conservative estimate. Fishing activity on such a dam can ably be handled by an organised group of 5-7 people but the wider community will benefit through improved nutrition as a result of fish availability and also the resource rentals.

41. The capital requirement to fish on such a dam is minimal as the waters are relatively calm. Thus, the capital requirements will essentially comprise a canoe, gillnets and fishing nets all together estimated to cost Nakfa50,000. On the operating inputs, these will be minimal, given that no feeding will be applied since that the same water is used for livestock and domestic purposes. Therefore, the key input costs will be only labour, resource rental and operations and maintenance. The physical requirements are presented in the table below:

Table 16: Physical quantities (Outputs and inputs) for one inland fishing group

Item	Unit	Financial Unit Prices ERN	Econmic Unit Prices ERN	Without Project	With Project									
					Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y8	Y10
Main Production														
Annual catch level	Kg	20	20	0	2,680	4,690	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700
Unskilled Labour	Per Day	60	48	250										
Inputs														
Investments (CAPEX)														
Canoe, gillnets and fishing net	ls	50000	50000		1									
Operating														
Labour	Per day	60	48		728	728	728	728	728	728	728	728	728	728
Resource rent	per Kg	5	5		2680	4690	6700	6700	6700	6700	6700	6700	6700	6700
Operatiion and maintenance (10%)	p.a	5000	5000		1	1	1	1	1	1	1	1	1	1

42. ***Financial budget*:** Multiplying the financial prices and quantities in table 16 above yields the financial budget for one fish drying cooperative shown in table 17 below.

Table 17: Financial budget for one inland fishing group

Financial Budget (ERN)

			Without Project	With Project									
				Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production													
Annual catch level		Kg	-	53,600	93,800	134,000	134,000	134,000	134,000	134,000	134,000	134,000	134,000
Unskilled Labour	Per Day		-	-	-	-	-	-	-	-	-	-	-
Sub-total Revenues			-	53,600	93,800	134,000	134,000	134,000	134,000	134,000	134,000	134,000	134,000
Inputs													
Operating													
Labour	Per day		-	43680	43680	43680	43680	43680	43680	43680	43680	43680	43680
Resource rent	per Kg		-	13400	23450	33500	33500	33500	33500	33500	33500	33500	33500
Operatiion and maintenance (10%)	p.a		-	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Sub-total Operating Costs			-	62080	72130	82180	82180	82180	82180	82180	82180	82180	82180
Total Production Costs			-	62080	72130	82180	82180	82180	82180	82180	82180	82180	82180
Gross Income			-	-8480	21670	51820	51820	51820	51820	51820	51820	51820	51820
Investments				50000									
Net cash flow (before financing)				-58480	21670	51820	51820	51820	51820	51820	51820	51820	51820
	NPV @10% (ERN)	193221											
	IRR	67.0%				61.7							
	Benefit/Cost Ratio	1.6											1.6

43. Table 17 above shows that an inland fishing group has the potential to generate a positive NPV of ERN 193,000 and positive financial rate of return of 67%. The percentage change in annual net income of fish processors would increase by 193% (mid-term and end target).

44. ***Economic Budget*:** In the case of fish trading, shadow pricing has been applied to labour at a rate of CF=0.8. A comparison of financial and economic prices is presented in table 16 which shows that for other items CF=1.

Table 18: Economic budget for one inland fishing group

Economic Budget (ERN)

	Without Project	With Project									
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Main Production											
Annual catch level	-	53,600	93,800	134,000	134,000	134,000	134,000	134,000	134,000	134,000	134,000
Unskilled Labour	12,000	-	-	-	-	-	-	-	-	-	-
Sub-total Revenues	12,000	53,600	93,800	134,000	134,000	134,000	134,000	134,000	134,000	134,000	134,000
Inputs											
Operating											
Labour	-	34944	34944	34944	34944	34944	34944	34944	34944	34944	34944
Resource rent	-	13400	23450	33500	33500	33500	33500	33500	33500	33500	33500
Operatiion and maintenance (10%)	-	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Sub-total Operating Costs	-	53344	63394	73444	73444	73444	73444	73444	73444	73444	73444
Total Production Costs	-	53,344	63,394	73,444	73,444	73,444	73,444	73,444	73,444	73,444	73,444
Gross Income	12,000	256	30,406	60,556	60,556	60,556	60,556	60,556	60,556	60,556	60,556
Incremental net income (WP-WOP)	-	11,744	18,406	48,556	48,556	48,556	48,556	48,556	48,556	48,556	48,556

45. ***Aggregation of economic benefits*:** From the incremental economic benefits presented in table 17 above and the cascading number of inland fishing groups by year, the aggregated economic benefits are presented in table 19 below:

Table 19: Aggregate economic benefits from all inland fishing groups

Number of Groups/ cooperatives		5	5	5							
Cascading number of groups/ Cooperatives											
	Progressive incremental benefits (ERN)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Groups in their year 1	- 11,744	5	5	5	-	-	-	-	-	-	-
Groups in their year 2	18,406		5	5	5	-	-				
Groups in their year 3	48,556			5	5	5	-	-			
Groups in their year 4+	48,556				5	5	5	-	-		
Aggregated benefits- inland fishing		-	-	-	-	-	-	-	-	-	-
Groups in their year 1		- 0.06	- 0.06	- 0.06	-	-	-	-	-	-	-
Groups in their year 2		-	0.09	0.09	0.09	-	-	-	-	-	-
Groups in their year 3		-	-	0.24	0.24	0.24	-	-	-	-	-
Groups in their year 4		-	-	-	0.24	0.24	0.24	-	-	-	-
Groups in their year 5		-	-	-	-	0.24	0.24	0.24	-	-	-
Groups in their year 6		-	-	-	-	-	0.24	0.24	0.24	-	-
Groups in their year 7		-	-	-	-	-	-	0.24	0.24	0.24	-
Groups in their year 8		-	-	-	-	-	-	-	0.24	0.24	0.24
Groups in their year 9		-	-	-	-	-	-	-	-	0.24	0.24
Groups in their year 10		-	-	-	-	-	-	-	-	-	0.24
Sub-total Total incremantal income from inland fishing- ERN millions		***(0.06)***	***0.03***	***0.28***	***0.58***	***0.73***	***0.73***	***0.73***	***0.73***	***0.73***	***0.73***

V. Analysis of the NRM Activities

46. Besides the benefits related to the front line activities, including the increase in landed and processed fish volumes, the investment in the mangrove forests and inland catchment treatment (forestation, etc.) will offer opportunities for small-scale cottage industries, such as honey production. Under Natural Resources management, each household is associated with about 1.34 hectares of natural resources rehabilitation (17,000 ha and 12,646 households) with an incremental income of ERN 4,300 per annum; in addition to the usual routine activities.

Table 20: Indicative income that can be obtained from a 5-hive apiculture unit

Indicative apiculture model				
Unit: 5 Hives- Producer	1.00 USD=		15	Nakfa
	Unit of Measure	**Yield/ Quantity**	**Price**	**ERN**
Income				
Honey	Kg	100	50	5,000
Wax	Kg	70	60	4,200
Total Income				**9,200**
Expenses				
Feed - Sugar (During dry season to avoid abscondment)	Kg	10	55	550
Protein (During dry season to avoid abscondment)	Kg	5	65	325
Queen Purchases				500
Hive Treatments (against termites etc)	Ltrs	5	65	325
Labour/ Extension Cost Technical support				
--Inspecting,	Man-Days	10	100	1000
-- Harvesting	Man-Days	5	100	500
Family labour		20	60	1200
Hive Repair				500
Total Expenses for a 5-hive producer				4,900
Net Income for a 5-hive Producer				**4,300**

47. With 12,646 households that will benefit from NRM activities, the incremental economic benefits can be enormous in aggregate as shown in table 21 below.

Table 21: Indicative income that can be obtained a 5-hive apiculture unit

	Progressive incremental benefits (ERN)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Beneficiary HH in their year 1	2,150	500	2,000	3,000	4,000	3,000					
Beneficiary HH in their year 2	3,010		500	2,000	3,000	4,000	3,000				
Beneficiary HH in their year 3	4,300			500	2,000	3,000	4,000	3,000			
Beneficiary HH in their year 4+	4,300				500	2,000	3,000	4,000	3,000		
Phased benefits											
Beneficiary HH in their year 1		1	4	6	9	6	-	-	-	-	-
Beneficiary HH in their year 2		-	2	6	9	12	9	-	-	-	-
Beneficiary HH in their year 3		-	-	2	9	13	17	13	-	-	-
Beneficiary HH in their year 4+		-	-	-	2	9	13	17	13	-	-
Beneficiary HH in their year 1		-	-	-	-	2	9	13	17	13	-
Beneficiary HH in their year 2		-	-	-	-	-	2	9	13	17	13
Beneficiary HH in their year 3		-	-	-	-	-	-	2	9	13	17
Beneficiary HH in their year 4+		-	-	-	-	-	-	-	2	9	13
Beneficiary HH in their year 3		-	-	-	-	-	-	-	-	2	9
Beneficiary HH in their year 4+		-	-	-	-	-	-	-	-	-	2
Total benefits		**1**	**6**	**15**	**28**	**42**	**50**	**54**	**54**	**54**	**54**

VI. Economic Analysis

48. The aggregate economic benefits presented at the end of each model are tabulated in the overall aggregation table below.

Table 22: Overall aggregation of economic benefits and computation of economic rate of return

		Reference	Y1	Y2	Y3	Y4	Y5+	Y6	Y7	Y8	Y9	Y10
Fishing co-operatives for small pelagic fish		*Table 6*	*4*	*7*	*14*	*19*	*28*	*32*	*38*	*38*	*38*	*38*
Fish processing/ drying		Table 11	(1.13)	(2.52)	1.69	11.28	21.27	27.30	28.59	28.59	28.59	28.59
Inland fishing		Table 19	(0.06)	0.03	0.28	0.58	0.73	0.73	0.73	0.73	0.73	0.73
Fish trading		Table 15	0.21	0.70	1.34	2.04	2.54	2.74	2.80	2.80	2.80	2.80
Incremental Benefits from NRM activities		Table 21	1.08	5.81	14.62	28.38	42.14	49.88	53.75	53.75	53.75	53.75
Total Incremental Economic Benefits			**4**	**11**	**32**	**61**	**95**	**113**	**124**	**124**	**124**	**124**
Programme economic costs												
	Programme economic costs- ERN millions	Costab	124.5	59.0	120.1	45.2	32.8	24.4	16.5	0.0		
	Recurrent costs after Project closure									6	6	6
Total Programme Economic Costs			124.5	59.0	120.1	45.2	32.8	24.4	16.5	6.4	6.4	6.4
Net Incremental Economic Benefits			(120.8)	(47.6)	(88.5)	15.9	61.8	88.7	107.0	117.1	117.1	117.1
	ERR		17%									
	NPV- Millions of ERN (8%)		125									

49. The results of the economic analysis justify the Programme's investments. The analysis shows that the Programme has the capacity to generate an ERR of 17% percent over a 10-year period.

50. **Sensitivity analysis.** A number of scenarios were tested to establish the economic viability of the total Programme in the event of adverse factors. The ERR is relatively stable with regard to cost increases, benefits reductions and time lags. The sensitivity analysis was linked to potential risks associated with the Programme. The ERR ranges from 11-17%.

17%	ERR for Overall Programme- Base Case	Simulated risks
14%	ERR if benefits decrease by 10%	• Catch levels drop • Selling prices fall • Postharvest losses increase
14%	ERR if costs increase by 10%	• Costs of operating inputs increase
13%	ERR if benefits lag by one year	• Lengthy procurement processes • Delays in formation of Cooperatives/ groups
11%	ERR if benefits lag by two years	• Lengthy procurement processes • Delays in formation of Cooperatives/ groups

Appendix 11: Draft FReMP implementation manual (*To be finalised*)

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ABBREVIATIONS AND ACRONYMS

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III. PLANNING, MONITORING & EVALUATION AND KNOWLEDGE MANAGEMENT
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IV. FINANCIAL MANAGEMENT AND ACCOUNTING
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- C. Flow of Funds
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V. FREMP PROCUREMENT
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- B. FREMP Procurement Roles and Responsibilities
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VI. COOPERATIVE AND CREDIT UNIT OPERATING MODALITIES

[42] Draft PIM will be prepared and included as a separate document.

Appendix 12: Social, environmental and climate review note[43]

A. Major landscape characteristics and Issues

1. Eritrea lies within the Horn of Africa. It has a coastline of approximately 1,350 kms along the Red Sea, as well as both lowlands and hilly inland topography, reaching altitudes of over 2000 m.a.s.l. The Programme will be implemented both at the coast, as well as within the highlands.

2. **Socio-cultural context** – (see Appendix 2 for details). More than two decades after attaining independence in 1993, Eritrea is still faced with many development challenges. The main economic sectors are yet to fully recover from the effects of 30 years of war, leading to a state of massive unemployment, few income generating opportunities and general poverty. Poverty is most severe along the coastal plains, though the combination of war and recurrent droughts has affected the whole country. Nutrition is a major issue, especially amongst children. Women are disproportionately responsible for agricultural work on smallholdings, while many men are occupied by looking for work in towns.

3. **Natural resources –** Eritrea is endowed with significant natural resources, which are currently poorly utilized and managed. Inland, Eritrea suffers from significant levels of soil erosion. This constitutes one of the main environmental problems in the highlands[44]. Around half of the land is grazed/ browsed by livestock, and (in 1995) it was estimated that nearly 10% was under cultivation. There has been considerable and continuous deforestation: from 30% under forest cover in 1895 to 5% by 1960, and since 1970 deforestation rates have been on average 0.35%/year[45]. Aggressive invasive species are evident on the mainland: notably the cactus *Opuntia* in the highlands and *Prosopis juliflora* along the coastal belt. Eritrea has mineral resources as well as potential oil and gas reserves, which are currently being explored.

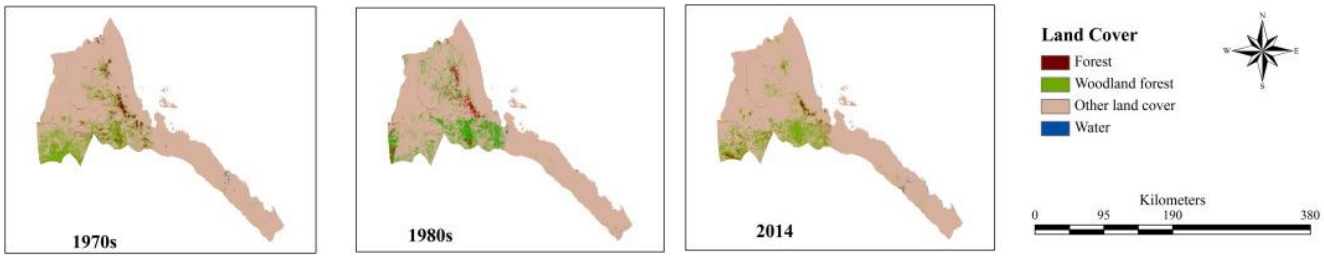

Figure 1 Forest cover 1970-2014. Source: Ghebrezgabher et al (2014)

4. Eritrea's long coast is rich in natural resources, too. Current estimates of mangrove forests range between 49 and 74 km^2 (the dominant species being *Avicennia marina*), yet largely degraded, while they play a critical role in the functioning of the ecosystem and the breeding of fish. Nevertheless the many off-shore islands are relatively well protected by virtue of their inaccessibility. The coast is home to an abundance of coral, being hotspots of biodiversity. The capacity of the Eritrean corals to endure the relative warm waters of the Red Sea is remarkable and has led researchers to believe it might contain heat resistant algae[46]. Fish resources are also plentiful, including sardines, anchovies, tuna, snappers, cod, groupers, shrimps and lobster. The corals are further home to some nearly 220 species of coral and rare ornamental fish species. Appendix 14 deals in detail with estimates of fish resources and their maximum sustainable yields (MSY), which are summarized in table 1.

[43] In 2014 IFAD updated and reframed its policies with respect to social, environmental and climate assessment procedures (SECAP). This note follows those guidelines ("IFAD's Social, Environmental and Climate Assessment Procedures – managing risk to create opportunities" 2014) which is based on compliance with IFAD's strategies and policies governing development, society, the environment and climate.
[44] GoE, 1995. National Environmental Management Plan.
[45] Ghebrezgabher et al (2014) Extracting and analyzing forest and woodland cover change in Eritrea based on landsat data using supervised classification. http://dx.doi.org/10.1016/j.ejrs.2015.09.002
[46] See http://www.smh.com.au/world/eritrean-coral-reefs-provide-hope-for-global-marine-future-20080415-26f3.html

Table 1 Historical estimates of Maximum Sustainable Yield ('000 MT/yr). Details and references in appendix 14.

Demersal fish	Reed based demersal	Shrimp	Spiny lobster	Coastal pelagics	Neritic & oceanic pelagics	Sharks	Total	Source
10-15		0.5	0.5	50		5	**66.0-71.0**	Atkins, 1956
10				50		5	**65**	Ben Yami, 1964
	3.5			25-50		5	**33.5-58.5**	Grofit, 1971
8.5		0.5	-	25	-	2	**36**	Gaudet (1981).
18		0.5	0.5 – 1.0	25.0 – 50.0	5	2.0 – 5.0	**51.0 – 79.5**	Guidicelli (1984)
17.0 + 5.5		0.5	0.5	24	6	5	**58**	Antoine *et al*., 1998
5	17	0.5	0.5	24	6	5	**58.0**	IFREMER/MoF, 1998
8.5	**3**	**0.5**	**0.5**	**24**	**5**	**2**	**40.0**	**Lowest MSY**
18	**5**	**0.5**	**1**	**50**	**5**	**5**	**84.5**	**Highest MSY**

5. **Climate** – Eritrea's has six agro-climatic zones[47]. The central highlands, are situated at an altitude over 1500 m.a.s.l. The western escarpment zone is lower, with a warm to semi-arid climate and rainfall of up to 500 mm per annum. The south-western highlands range between 600 and 750 m.a.s.l. and here the rainfall is lower and conditions hotter. Even drier and hotter still are the north-western lowlands. The "green belt" of the eastern escarpment ranges between 750 and 2000 m.a.s.l. and receives rainfall of around 1000 mm per annum, mostly between June and September. This is the most productive zone in agricultural terms. Finally the coastal plains have a desert climate, with less than 200 mm rainfall per annum (Ministry of Agriculture, 2015).

6. **Key social, environmental and climate issues** – Targeted communities are faced with the following key issues:

a. Poverty and malnutrition is widespread and especially pronounced along the coastal plains, who exploit the natural resource base to meet immediate household needs.
b. Fish production from the sea is not impacting significantly on diets of coast dwellers, and crop production inland is unreliable and lacks diversity.
c. Land use practices in the relatively productive highlands are not sustainable, threatening future productivity and posing flood and sedimentation risks on lower parts of the catchment.
d. The dessa system of land tenure – under which holdings are redistributed every seven years, discourages investment in the land.
e. Coastal ecosystems, mainly mangroves, seagrass beds and coral reefs are under threat of increased sea temperatures, sedimentation, rising seas levels, human overexploitation and grazing.
f. Integrated Coastal Zone / Area Management is still nascent and there exists little cooperation with neighbouring Red Sea countries
g. Current agricultural practices may not be adequate for expected future temperatures.

B. Potential social, environmental, and climate change impacts and risks

7. The expected positive social and environmental impacts of FReMP are:

a. **Improved livelihoods for target households**, including higher income and higher food and nutrition security
b. **Restored coastal ecosystem services** through the rehabilitation and planting of mangroves, thereby reducing coastal erosion, increasing habitat for fish, providing sustainable alternative income sources (e.g. through beekeeping)
c. **Restored terrestrial ecosystem services** through interventions in watershed management, reducing soil erosion and sedimentation of downstream reservoirs and rivers, increasing water retention and dry-season water availability,
d. **Increased climate resilience** through (i) restored and more stable ecosystem services described above, (ii) interventions adapted to future changes in water temperature,

[47] MoA 2015. The State of Eritrea.

evaporation rates and extreme weather events and (iii) diversified livelihoods.

8. Potential negative social and environmental impacts of FReMP are:
   a. **Overexploitation of marine fish resources.** Revitalization of the fisheries sector may trigger over-exploitation of fish resources. Current Programme targets are 19,000 *t* for small pelagics, while historical estimates of MSY for this group range between 24,000 and 50,000 *t*.
   b. **Increased pressure on other coastal natural resources.** Increased commercial activity may slightly increase pressure on coastal ecosystems, especially increasing use of mangroves for firewood and animal fodder.
   c. **Pollution and poor waste management related to increased fishing activity.**
   d. **Environmental impact of aquaculture and mariculture pilots.** Mariculture and aquaculture may have a negative impact in terms of water eutrophication (increasing nitrogen and phosphorus levels). Influence on the existing reservoir ecosystem or downstream riverine systems will be limited as the pilots will operate in existing reservoirs.
   e. **Water use conflicts related to inland fisheries.** Increased (consumptive) use of water for inland fisheries may have negative effect on other water users (domestic water supply, cattle, irrigation).
   f. **Environmental impact of construction.** Potential impact of foreseen construction activities (drying facilities, cages, multi-purpose facilities) are inadequate waste disposal, noise pollution

9. Climate change trends and impacts in Eritrea, relevant to FReMP, are:
   a. **Temperature increase**. Mean annual temperatures have increased by 1.6 °C since 1960[48] and are expected to increase by 1.1 to 3.8 °C by the 2030s. Critical heat tolerance thresholds for major cereals may be exceeded, significantly impacting food security. Reduced soil moisture could decrease availability of grazing land, thereby affecting the livestock sector.
   b. **Rainfall season shift.** Based on the limited data available, there have been no statistically significant changes in rainfall patterns over the last 50 years. There is no consensus between climate models on future mean annual rainfall or frequency / intensity of extreme events. There is however a consensus on expected shifting of seasons, which would have an impact on planting seasons and suitable crop varieties.
   c. **Seawater temperature increase.** A recent study[49] noted an increase in Red Sea water temperatures of about 0.7 °C since the 1990s, strongly influenced by air temperatures. In line with global trends, this increase is likely to continue. Increased water temperatures will probably affect the size and migration of fish stocks, though there is limited information available on this phenomenon with regards to the Red Sea. Differential increases in temperature may also cause changing upwelling patterns, in turn affecting fish stocks.
   d. **Sea-level rise.** Modeled sea-level rise for Massawa at the Red Sea coast is 8-12 cm by the 2030s, 12-22 cm by the 2050s and 26-58 cm by the end of the century. There are no comprehensive studies on the impact of this rise on the Eritrean coast. It is however clear that the expected rise should be taken into account when planning new infrastructure. Mangroves are expected to adjust gradually to the changing water levels.

C. Environmental and social category

10. The risk of over-exploitation of marine fish resources, notably small pelagic fish, deserves special attention of the Programme. The end-of-Programme target annual harvests for small pelagics (19,000 *t*) are below the lower bound of historical MSY estimates for this category (24,000 – 50,000 *t*). It should, however, be noted that the last estimates date from 1998. Environmental change, human activities, climate change (seawater temperature rise) and natural migration of fish have likely influenced fish stocks in the intervening 20 years. Yet, a review of literature provides no solid evidence of downward or upward trends in fish stocks in the Eritrean Red Sea since the last estimate of MSY.

[48] Eritrea's Second National Communication to the UNFCC, 2012
[49] Raitsos et al. (2011). Abrupt warming of the Red Sea. http://dx.doi.org/10.1029/2011GL047984

11. All in all, it is assessed that FReMP has set "safe" target levels and that all necessary mitigation measures to manage the risk of over-exploitation have been adequately integrated into the Programme. These mitigation measures are part of the *precautionary approach* to fisheries management, which is based on "exercising prudent foresight to avoid unacceptable or undesirable situations, taking into account that changes in fisheries systems are only slowly reversible, difficult to control, not well understood, and subject to change in the environment and human values."[50] The mitigation measures include (i) setting modest targets below MSY, (ii) building MMR's capacity on monitoring, control and surveillance, (iii) updating MSY estimates and adjust targets where needed, and d) invest in restoration and protection of the ecosystem.

12. All other potential negative impacts caused by the Programme as listed in section B are limited, site-specific and mitigation measures are readily identified. In conclusion, the overall Programme is categorized as **Category B**. GoE's environmental and social screening and assessment procedures will be carried out by MMR out for specific activities (inland fisheries, construction activities), in close collaboration with the Department of Environment.

D. Climate risk category

13. The Programme's sensitivity to climate change impacts is assessed as **moderate**. Similar to the environmental and social categorization, the largest risk emanates from the unknown impact of increasing sea temperatures on marine fish resources. The Programme however, through its monitoring activities, will be able to adjust to changes in fish stocks. At this design stage, there is no data available to carry out an in-depth climate risk assessment. Yet, data generated by the Programme could be used to carry out an analysis of climate change impact in the future. Climate risks to other Programme interventions are minimal and can be readily addressed through the mitigation measures outlined in Section E.

E. Recommended features of Programme design and implementation

14. Measures to mitigate and manage risks as listed in section B are listed in the table below

Table 2 Social and Environmental Risks and Mitigation Measures

Risk	Mitigation Measures
Exploitation of marine fish resources	• Capacity building of MMR institutions including regulatory services, monitoring, control and surveillance as well as operationalisation of vessel monitoring systems introduced under
Increased pressure on other coastal natural resources	• Rehabilitation and conservation of mangroves that both protect the coastal ecosystem and yield direct benefits in terms of sustainably harvested wood and fodder, while potentially yielding honey • Afforestation to reduce pressure on mangroves, using *Casuarina equisetifolia* for example • Use of invasive *Prosopis juliflora* for fuelwood using improved cooking stoves/ smoking of fish instead of overharvesting and thus degradation of mangroves
Pollution and poor waste management related to increased fishing activity	• Establishment of groups of fisher folk with agreed codes of fishing and environmental practice • Training in fishing practices including stocking and sustainable harvesting
Environmental damage from mariculture and inland aquaculture pilots	• Carry out environmental and social impact screening, and where required assessment, for each pilot in close collaboration with the Department of Environment. • Training in all aspects of mariculture/ aquaculture including stocking, feeding, harvesting and processing: to be piloted on small scale initially Maintaining a clean and protected environment around cages/ ponds • Fencing/ planting of protective species and observing codes of conduct with respect to cleanliness
Water use conflicts related to inland fisheries.	• Preparation of joint dam management plans outlining current and future water uses and potential impact of climate change on reservoir capacity and evaporation rates • Empowerment of the Dam WUAs to develop and enforce community bylaws

[50] See http://www.fao.org/docrep/003/w3592e/w3592e07.htm

Risk	Mitigation Measures
Environmental impact of construction.	• Adherence to GoE environmental screening and assessments process as part of feasibility studies • Strong Programme oversight
Increased temperatures and more erratic rainfall patterns	• Investment in improving and sustaining climate resilient ecosystems both at the coast (including mangrove rehabilitation) and inland (watershed management • Capacity building of beneficiaries in 'climate-smart thinking' through training and exchange visits (some international, thus 'South-to-South' learning).

Table 3 Climate change impacts and adaptation strategies

Risk	Mitigation Measures
Seawater temperature increase, effects on marine fish resources	• Strengthening of MMR monitoring capacity to allow adaptive management of the Programme in terms of investment strategies and targets
Sea-level rise, threatening Programme-financed assets	• Feasibility studies for infrastructure to include projections of sea-level over the expected asset life time
Temperature increase, rain season onset shift affecting rain-fed agriculture and livestock	• Watershed management activities to increase soil moisture content, water harvesting • Training on good, climate-adapted agricultural practices including adapted varieties

15. The Programme will also provide a foundation for helping to meet targets of the three environmental conventions (biodiversity, land degradation and climate change) by its various activities – especially when the values chains mature and are fully embedded in Eritrea's economy. Likewise, the Programme will contribute to the platform of practitioners in the fields of local governance and sustainable marine, as well as mainland watershed management by investing in the national body of knowledge in these fields.

16. **Incentives for good practices**. The Programme will, throughout, reward good practice, by responding to increasing levels of demand for knowledge. One specific example is the intention to plan for exchange visits both within Eritrea and outside her boundaries to learn more, and to trade experiences in practices.

17. **Participatory processes**. FReMP will engage with communities (and other stakeholders, technical, academic and commercial) that are willing to participate, not just in implementation, but in planning, monitoring and responding also. There will be a deliberate policy of supporting the decentralisation process towards empowering Zobas in decision-making and management of their own resources.

F. Analysis of alternatives

18. The Programme integrates environmental objectives into a programme for fisheries productivity and marketing development. An alternative to further increase focus on environment and climate change adaptation would be to increase the scale of ecosystem-related interventions. However, it is assessed that the currently proposed Programme strikes a good balance between income and ecosystem protection, as well as between having an all-inclusive programme with a wide diversity of stakeholders versus a more focused and implementable programme.

G. Institutional analysis

19. **Institutional framework**. Programme implementation arrangements are described in Appendix 5. To ensure relevance, ownership and sustainability, Programme planning, implementation and monitoring and evaluation will be mainstreamed into the decentralised GoE institutional frameworks and aligned GoE's strategic development goals and sector policies. Participating institutions at national and Zoba levels will be supported and strengthened to build institutional capacity and sustainability. The communities and grassroots institutions, such as fisher cooperatives, enterprise groups and watershed management committees, will be mobilized and strengthened to build their capacity for greater sustainability and ownership of the Programme interventions.

20. Following GoE's guidelines on environmental and social impact assessment, the responsibility to safeguard social and environmental interests is vested with the line ministries. The Department of Environment, housed in the Ministry of Land, Water and Environment has an advisory role when it comes to planning and implementation. It is the intention of the Government that line ministries take responsibility for monitoring the implementation of safeguards, which is not yet currently the case. Therefore, the Programme will make a deliberate effort to increase collaboration between Department of Environment, MMR and MOA, in an attempt to facilitate this process.

21. **Capacity building**. Capacity building will take place at various levels. These include COMSAT (the College of Marine Science and Technology), Hirgigo Fisheries Training Institute, and also through the various Ministries involved in inland fishing/ catchment protection (Ministry of Lands, Water and Environment, and the Ministry of Agriculture, for example). Environment and climate issues are integrated into the various capacity building efforts provided.

H. Monitoring and Evaluation

22. Reference is made to Appendix 6 of the PDR. The Programme's logframe includes indicators that reflect the linkage between poverty, environment and climate change and indicators to adequately capture the impact of Programme activities on the marine and land-based environment. Monitoring mechanisms include participatory environmental, climatic, social and adaptation monitoring.

I. Record of consultations

23. The overall Programme design process has been consultative, based on stakeholder experience under not just FReMP but also the CLMP and NAP projects. There have been consultations with other UN organisations as well as fishery groups and women's groups. Above all design reflects insights gained from interaction with the female and male fishers in the Programme area. At all stages the GoE has been hands-on with advice and direction.

Appendix 13: Contents of the Project Life File

PRIOR DOCUMENTS

COSOP
CSN
FDP Formulation Report
FDP Appraisal Report
FDP MTR Report
FDP Supervision Reports
FDP Baseline Study, 2010
FReMP Concept Note

PDR Appendices (as prepared by the Design Mission)

Appendix 1:	Country and Rural Context Background
Appendix 2:	Poverty, Targeting and Gender
Appendix 3:	Country Performance and Lessons Learned
Appendix 4:	Detailed FReMP Description
Appendix 5:	Institutional Aspects and Implementation Arrangements
Appendix 6:	Planning, M&E and Learning and Knowledge Management
Appendix 7:	Financial Management and Disbursement Arrangements
Appendix 8:	Procurement
Appendix 9:	Programme Costs and Financing
Appendix 10:	Economic and Financial Analysis
Appendix 11:	Draft FReMP Implementation Manual
Appendix 12:	Social, Environmental and Climate Review Note
Appendix 13:	Contents of the Project Life File
Appendix 14:	Status of Marine Fisheries and Fishing Potential in Eritrea
Appendix 15:	Status of Inland Fisheries in Eritrea
Appendix 16:	Fish Production and Market Linkage in Eritrea
Appendix 17:	Nutrition

KEY REFERENCE DOCUMENTS

- Eritrean Economic Outlook, 2015
- FAO Report on Eritrean Fisheries, 2015
- Eritrea: Population and Health Survey, 2010
- Eritrea: National Fisheries Proclamation, 2014
- Eritrea: National Fishery Products Proclamation, 1998
- Eritrea National Fishing Vessel Regulations, 1998
- Eritrea Foreign Fishing Vessel Regulations, 1998
- Several Eritrea Fisheries Products Standards Regulations, 2003
- Eritrea Aquaculture Products Regulations, 2003
- Eritrea Country Brief at the occasion of IFAD GC Feb. 2016
- CPMs Quick Guide-ESA-SECAP
- Doing Business in Eritrea 2014
- E-FDR issues Paper Dec 2015
- Eritrea and Ethiopia beyond the Impass, Jason Mosley, Chatham House, The Royal Institute of International Affairs Africa Programme | April 2014 | AFP BP 2014/01

- Eritrea AfDB Interim Country Strategic Note 2014-2016, Sept 2014
- Eritrea AfDB PCR for Fisheries Infrastructural Development Project
- Eritrea Intended Nationally Determined Contribution Report (INDCs) to COP21, Sept. 2015
- ESA SECAP procedures
- Fiduciary Summary for Eritrea portfolio by CFS Dec 2015
- Resources Mobilization Strategy for financing UNDP Eritrea Country Programme 2013-2016
- GHM Appraisal CLMP

MISSION DOCUMENTS

- Terms of Reference for Design Mission
- Aide Memoire of Design Mission (April 2016)

IFAD REVIEW DOCUMENTS

- Minutes of 1st CPMT on FReMP Concept Note
- OSC Issues Paper, December 2015

Appendix 14: Status of Marine Fisheries, Fishing Potential and Management Options in Eritrea

Background information

1. The objective of FReMP is the development of fish production and market linkages of marine species, especially the small pelagics, as well as inland fisheries, including aquaculture. The programme incorporates infrastructure development and capacity building of implementing institutions at National and Zoba levels[51,52]. FReMP proposed activities include support to artisanal fishers, promotion of cooperative organizations, post-harvest handling and support to marketing. The Maximum Sustainable Yield (MSY)[53] is a useful indicator for sustainability of fisheries resources and will be determined through stock assessment and reporting of the stock status of the targeted species, with particular focus on the small pelagic fisheries. FReMP will support a number of activities related to stock assessment a) development of catch and effort database infrastructure at MMR; b) upgrading and installation of a Database Management System (DBMS) for fisheries at MMR; c) capacity building of MMR and its collaborators on database management; d) developing biological data collection system to support stock assessment in addition to catch and effort data collection; and d) capacity building of MMR in stock assessment and decision support system.

2. The fishing zones have been well mapped[54] for the Eritrean artisanal fishery. By 2011, there were a total of 64 recognised fishing villages distributed in the Semhar coast (3), Dahlak Island (14), Dankalia coast (26) and Dankalio-Tio border (11), with a total of over 1,400 full time fishers.

Policy and Legal Framework

3. The policy, legal and regulatory framework and fisheries development in Eritrea are contained in: a) Eritrea National Fisheries Proclamation (2014); b) Eritrea National Fishery Products Proclamation (1998); c) Eritrea National Fishing Vessel Regulations (1998); d) Eritrea Foreign Fishing Vessel Regulations (1998); e) Several Eritrea Fisheries Products Standards Regulations (2003); f) Eritrea Aquaculture Products Regulations (2003), among others; g) FDP Supervision mission reports to date; h) FReMP PCN; i) OSC Issues Paper and signed minutes; j) Draft CSN for Eritrea; k) FDP Appraisal Report; l) FDP Grant Agreement m) FDP PIM; n) FDP MTR Aide-mémoire; o) FDP Progress Reports; p) FDP Letter to the Recipient; q) Eritrea Fisheries Management Plan and Fisheries Development Plans. Eritrea's legal framework provides for a number of legislative and administrative measures to ensure sustainable management of the marine aquatic resources in the country. The most applicable legal instrument is the Fisheries Proclamation No. 176/2014 that provides explicitly for: a) fisheries administration; b) fisheries management; c) licensing; d) aquaculture development; and e) enforcement. FReMP will support activities that increase the efficiency, implementation and contribution to these functions of MMR, including the development of Small Pelagic Fishery Management Plan.

Stock Assessment and MSY estimates

a) Historical estimates

4. As outlined in t*he Eritrea Country Strategic Note*[55], the country's vast and relatively unexploited marine and fisheries resources have been underutilized for decades, existing in serene and un-polluted environment. The current total catches (of all species) stand at about 10,000 tonnes per year against MSY estimated in the range of 40,000 to 80,000 tonnes per year for all fisheries resources. The MSY for the small pelagic fishes (mainly anchovies and sardines) alone has been estimated at between 24,000 tonnes and 50,000 tonnes[56,57,58,59,60], of which FReMP is expected to produce up to

[51] Fisheries Development Project (FDP) Supervision Report 15th December 2015.
[52] Fisheries Development Project (FDP) Supervision Report 31st March 2016.
[53] Fisheries Development Project (FDP) Mid Term Review Report, April 20014.
[54] Fisheries Development Projects (PDR and Working Papers 2010)
[55] Eritrea Country Strategic Note 2016 – 2021.
[56] Ben-Yami M (1964) Report on the fisheries in Ethiopia. Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem.

19,000 tonnes of small pelagics per year. MSY for large pelagic species (including tunas) has been estimated at around 7,000 tonnes per year. The fishing capacity within the artisanal fisheries has been rising since 1991, with the total number of registered boats exceeding 450 by 2002. The catches are mainly made up of (a) snappers (Lutjanidea), such as two-spot red snapper (*Lutjanus bohar*), Humpback red snapper (*Lutjanus gibbosus*), and Humphead snapper (*Lutjanus sanguineus*); (b) groupers (Serranidae), including Brown-spotted grouper (*Epinephelus chlorostigma*), and Malabar grouper (*Epinephelus malabaricus*); (c) emperors (Lethrinidae), representing Longface emperor (*Lethrinus elongatus*), and Goldband jobfish (*Pristipomoides multidens*); and (d) mackerels and tunas (Scombridae), including Narrow-barred Spanish mackerel (*Scomberomorus commerson*) and Longtail tuna (*Thunnus tonggol*)[61].

5. MSY for demersal fisheries have been estimated at around 15,000-20,000 tonnes per year In order of greatest abundance the demersal species mainly include lizardfish (*Saurida spp.),* threadfin breams (*Nemipterus spp*.), barracuda (*Sphyraena spp*.), snappers (*Lutjanus spp*.) and groupers (*Epinephelus spp.*). The remainder of the estimated total MSY consists of shrimp (500 tonnes per year), lobster and other minor species.

6. The current total fish landings for all major species are therefore significantly less than the lower limit of the estimated MSY (40,000 tonnes) and therefore fisheries planning in Eritrea in recent years has concentrated on development activities to increase production in a sustainable way. FReMP will provide support to MMR for monitoring stocks and catches of the small pelagics, large pelagics, demersal and other species. It will support: a) infrastructure to collect catch, effort and biological data; b) capacity building to process and analyse of the data to determine MSY and other Biological Reference Points (BRPs); c) Updating previous stock assessment and regular reporting on the stock status; d) monitoring of stock performance over time. Specifically it will generate information on: a) Catch Per Unit Effort (CPUE) of these fisheries for different boat-gear combinations; b) their contribution to MSY; b) population parameters of the key demersal, large pelagic and small pelagic species; and c) biological information to supplement estimates of other BRPs.

[57] Grofit E (1971) The Red-Sea fisheries of Ethiopia (1966–1969). Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem.
[58] Atkins WSAP (1965) Development of the Fishing Industry in Ethiopia. WS Atkins and Partners, Surrey, UK, and Addis Ababa, Ethiopia.
[59] Giudicelli M (1984) The Ethiopian fisheries: situation, development needs and opportunities. A report prepared for the Fishing Planning and Development Project. FAO, Rome, FI: DEP/ETH/82/016.
[60] Grofit E (1971) The Red-Sea fisheries of Ethiopia (1966–1969). Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem.
[61] FAO Country Profile, Eritrea, 1993

Figure 1: Historical landings from the artisanal and industrial Red Sea fisheries of Eritrea reconstructed from Reynolds (1993) (1955, 1963–78), FAO (1983) (1950–54, 1979–90), and data (1991-2003[62]).

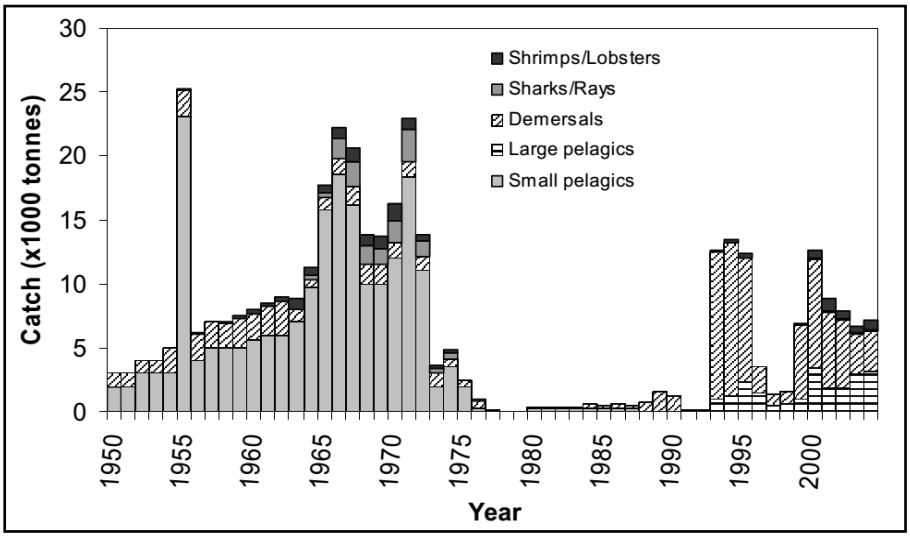

Table 1: Historical estimation of Maximum Sustainable Yield (MSY) by different authors

Demersal fish	Reed based demersal	Shrimp	Spiny lobster	Coastal pelagics	Neritic & oceanic pelagics	Sharks	Total	Source
10-15		0.5	0.5	50		5	**66.0-71.0**	Atkins, 1956
10				50		5	**65**	Ben Yami, 1964
	3.5			25-50		5	**33.5-58.5**	Grofit, 1971
8.5		0.5	-	25	-	2	**36**	Gaudet (1981).
18		0.5	0.5 – 1.0	25.0 – 50.0	5	2.0 – 5.0	**51.0 – 79.5**	Guidicelli (1984)
17.0 + 5.5		0.5	0.5	24	6	5	**58**	Antoine *et al*., 1998
5	17	0.5	0.5	24	6	5	**58.0**	IFREMER/MoF, 1998
8.5	**3**	**0.5**	**0.5**	**24**	**5**	**2**	**40.0**	**Lowest MSY**
18	**5**	**0.5**	**1**	**50**	**5**	**5**	**84.5**	**Highest MSY**

7. *MSY of Small Pelagics:* Despite the long time periods between comprehensive assessments, the estimates of Maximum Sustainable Yield from the various studies are quite similar and are used (together with ongoing monitoring) by the Ministry of Marine Resources for planning fisheries development strategies. Small pelagic resources (mainly the sardine, *Harengula punctata*, and anchovy, *Thrissocles baleana* and *Amentum heterobolum*, comprise the majority of the estimated total MSY for fisheries resources at around 50,000 metric tons per year[10].

b) **Best stock estimate adopted by FReMP and justification**

8. *Characteristics of Small-Pelagic Species:* Small pelagic fishes measuring 15 to 25 cm, mainly belong to the family *Clupeidae* (Sardines) and *Engraulidae* (Herrings/Anchovies). Many are shoaling species of great importance to fisheries as food and as bait. They constitute a larger proportion in the estimated MSY of the Eritrean waters together with other small pelagic species. In 1960s more than 25,000 tonnes of small pelagic catches were recorded from Eritrean watersThis was mainly beach-seine fishing activity, making the small pelagics the most important fishery in the 1950s and 1960s[17],

[62] Tsehaye, I., 2007. Monitoring fisheries in data-limited situations: A case study of the artisanal reef fisheries of Eritrea. PhD Thesis, Wageningen University, the Netherlands. With summary in English, Dutch and Tigrigna. ISBN: 978-90-8504-773-5

accounting for up to 90% of the total reported catch. Its main target species were sardine *Herklotsichthys quadrimaculatus*, and anchovy *Encrasicholina heteroloba* and *Thryssa baelama*, used mainly in the production of fishmeal that was exported to Europe and Asia. A small proportion of the catch was sun-dried for human consumption for markets in Asia (Sanders and Morgan 1989)[63]. The reported catches in 2000 and 2008 were 13,000 tonnes and 1,664 tonnes respectively, showing a tremendous decline.

9. *Stock Status:* Several attempts have been made to estimate the maximum sustainable yield (MSY) of the Eritrean marine fish resources. Historical estimates of the MSY has been reported in many reports as 40,000-80,000 tonnes. The latest estimate in 1997/98 is 58,000 tonnes. Various short-term investigations of specific stocks were mounted between the mid-1950s and the early 1980s[64]. Most figures put forward thus far have been based on limited catch rates, Catch per Unit Effort (CPU), on some experimental fishing, and on extrapolation from other areas using primary productivity data. The catch of small pelagic species in the past was estimated from export of fishmeal and extrapolation from Yemen and primary productivity and trawl surveys[65,66,67,68,69].

10. Despite the long time periods between comprehensive assessments, the estimates of MSY from the various studies are quite similar and are used (together with ongoing monitoring) by the Ministry of Marine Resources for planning fisheries development strategies. Small pelagic resources (mainly the sardine, *Harengula punctata*, and anchovy, *Thrissocles baelama* and *Amentum heterobolum*) comprise the majority of the estimated total MSY for fisheries resources[10].

11. There is a general consensus that the potential yield of the small pelagics is between 24,000 tonnes and 50,000 tonnes[70,71,72,73,74]. There are a number of existing stock indicators of the small pelagics that can be used as staring points for rapid stock assessment. These indicators are based generally on FAO Fishing Area 51 and are therefore applicable to the Red Sea region. FReMP will support the collection, processing, archiving, retrieval and analysis of species specific population parameters data in order to update the information and facilitate the estimation of MSY and other BRPs through development of database infrastructure and capacity building for stock assessment.

12. The general contemporary approach to stock assessment globally is the use of a number of indicators to determine the stock status. Depending on the objectives, alternative management options to MSY include Total Allowable Catch (TAC), Individual Transferable Quota (ITQ) and Total Allowable Effort (TAE) among others. MMR has already instituted area limitation by allowing the majority of small scale fishing operations to take place 20-160 km from Massawa in waters less than 30 m deep (which are off-limits to trawlers) using gill-nets to target pelagic species and hook and line for demersals. Other management options include restrictions or limitations to fishing areas, closed seasons and catch limit.

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[63] Dewit Tesfamichael1,2* and TJ (2007). Estimating the unreported catch of Eritrean Red Sea fisheries African Journal of Marine Science 2007 29(1): 55–63. EISSN 1814–2338. doi: 10.2989/AJMS.2007.29.1.5.70

[64] Sanders M. J and Morgan G. R (1989). Review of the fisheries resources of the Red Sea and Gulf of Aden. FAO Fisheries Technical Paper 304: 138pp.

[65] Ben-Yami M (1964) Report on the fisheries in Ethiopia. Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem

[66] Grofit E (1971) The Red-Sea fisheries of Ethiopia (1966–1969). Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem

[67] Atkins WSAP (1965) Development of the Fishing Industry in Ethiopia. WS Atkins and Partners, Surrey, UK, and Addis Ababa, Ethiopia

[68] Giudicelli, M. (1984). The Ethiopian fisheries: situation, development needs and opportunities. A report prepared for the Fishing Planning and Development Project. FAO, Rome, FI: DEP/ETH/82/016

[69] Grofit E (1971) The Red-Sea fisheries of Ethiopia (1966–1969). Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem.

[70] Ben-Yami M (1964) Report on the fisheries in Ethiopia. Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem

[71] Grofit E (1971) The Red-Sea fisheries of Ethiopia (1966–1969). Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem

[72] Atkins WSAP (1965) Development of the Fishing Industry in Ethiopia. WS Atkins and Partners, Surrey, UK, and Addis Ababa, Ethiopia

[73] Giudicelli M (1984) The Ethiopian fisheries: situation, development needs and opportunities. A report prepared for the Fishing Planning and Development Project. FAO, Rome, FI: DEP/ETH/82/016

[74] Grofit E (1971) The Red-Sea fisheries of Ethiopia (1966–1969). Ministry of Foreign Affairs, Department for International Cooperation, Jerusalem.

13. Since the attainment of MSY is always linked to stock assessment and reporting of the stock status for the small pelagic species, FReMP will support stock monitoring activities to ensure sustainability of the fisheries resources by supporting regular fish stock assessment and reporting, including estimation of MSY. However, recognizing that MSY is just one of the BRPs, FReMP will support the inclusion of other Biological Reference Points (BRPs) in the stock assessment and monitoring in order to obtain not only MSY but also Maximum Economic Yield (MEY), estimates of Spawning Stock Biomass (SSB), Total Harvestable Biomass (B) and population indicators of stock status of different species. Some of these indicators will include: a) growth parameters; b) mortality rates c) exploitation rates d) relative yield and average biomass per recruit; and e) impacts of different boat-gear combinations on the stocks. FReMP has adopted a **precautionary approach** to sustainability in setting the maximum harvest level at 19,000 tonnes per year which is on the lower side of potential MSYThe general contemporary approach to stock assessment globally is the use of a number of indicators to determine the stock status. Depending on the objectives alternative management options to MSY include Total Allowable Catch (TAC), Individual Transferable Quota (ITQ) and Total Allowable Effort (TAE) among others. MMR has already instituted area limitation by allowing the majority of artisanal fishing operations to take place 20-160 km from Massawa in waters less than 30 m deep (which are off-limits to trawlers) using gill-nets to target pelagic species and hook and line for demersals.

Data constraints

14. *Issues on Taxonomy and Species Identification:* Based on field visits, consultation and available literature, taxonomic categories for the catch and effort data analysis required for estimating MSY faces a number of challenges. For the small pelagic species, a combination of original, new and synonyms of taxonomic categories are still in use: a) the sardine *Herklotsichthys quadrimaculatus* is also known as *Clupea quadrimaculata* and *Harengula bipunctata*; b) the anchovy Thrissa baelama is also known as *Clupea baelama*, *Engraulis baelama*, *Scutengraulis baelama*, *Thrissina baelama* and *Thrissicles baelama*; c) the anchovy *Encrasicholina heteroloba* is also known as *Engraulis heteroloba*, *Anchoviela heteroloba*, *Stolephorus heterolobus*, *Encrasicholina heterolobus* and *Amentum heterobolum*. These three species currently form the bulk of the artisanal small pelagics fishery. Since there is technical gap in taxonomy, FReMP will support activities geared towards resolving taxonomic categories in catch and effort data as well as biological data to feed into stock assessment. FReMP will further support MMR to collect species dis-aggregated data for the small pelagics to facilitate species-specific stock assessment through collaboration with COMSAT and other service providers. FReMP will further support collection of biological data to feed into population dynamics of the small pelagics as a contribution to overall stock assessment.

15. *Standardization of Effort/CPUE:* CPUE for the artisanal marine fisheries is generally expressed as catch per trip (kg $trip^{-1}$). Differences in fishing power, gear type, crew number etc. among vessels may however create variations in CPUE unrelated to fish abundance. It is therefore essential to standardize CPUE to minimize bias and to be able to make valid comparisons across the entire fishery. A number of possible measures of effort, including crew size per trip, number of days per trip, man-days, and number of hooks or gillnets per trip, are related to the response variable CPUE[75]. Even though man-days is simply a product of crew size and number of days at sea, the anticipated use of man-days as a single predictor of CPUE, as opposed to crew size and number of days taken separately, might give rise to a more prudent model but is not in common use at the moment. Given the high variations in fishing gear and craft within the artisanal fisheries, the effort should be standardized for the most dominant boat–gear combinations. FReMP will therefore support capacity building of MMR to use various approaches in stock assessment including recently published methodologies to estimate MSY and other Biological Reference Points (BRPs). The approaches for stock assessment will involve collaboration with COMSAT and others service providers in order to develop and consolidate the available pool of expertise in this activity.

16. *Long Term Catch Effort Data Collection:* The design mission recognizes that whereas there is in place a catch effort data collection system for the Eritrean fishery, it is currently not effective due to technical challenges in both hardware and inadequate technical capacity. Some of these challenges include: a) having old database that require maintenance or replacement; b) inadequate database

[75] Tsehaye, I. 2007. Monitoring fisheries in data-limited situations: A case study of the artisanal reef fisheries of Eritrea PhD Thesis, Wageningen University, the Netherlands. With summary in English, Dutch and Tigrigna. ISBN: 978-90-8504-773-5

and need for installation/improvement in database infrastructure; c) inadequate capacity in stock assessment techniques; d) inadequate capacity in fish taxonomy; and e) inadequate technical knowledge in biological sampling and analysis of the most important small pelagic species. Since long term catch effort monitoring data is useful in fisheries management, FReMP will support efforts to address these inadequacies in technical capacity through training and re-training of MMR staff and their collaborators.

17. *Data Collection System:* The focus on data collection systems for the purposes of stock assessment show that: a) there is a good profile of the target small pelagic marine fish species in literature and a good level of taxonomic resolution to species, but this is not currently captured in the catch and effort data stored in the MMR database unless the catch is landed at the designated landing sites; b) fishing crafts being used include Houri and Sambuk and there is adequate literature to allow for standardization of their effort and eliminate undue bias and variation in estimating effort[23]; c) there is adequate auxiliary fishing information such as amount of time spent fishing that can facilitate the estimation of boat activity and current methods of catch standardization; d) the current catch-effort data collection does not include biological information which is required for stock assessment in data poor fisheries such as the artisanal small pelagics, especially growth, fecundity, size at massive maturity, size/age at first capture, and size frequency distribution among other parameters and indicators; e) most of the estimates of MSY have been based on a couple of surveys and extrapolated data from Yemen fishery and primary productivity; f) no standard approach or procedure has been developed for stock assessment of small pelagic species in the Eritrean marine waters. FReMP will support capacity building in the utilization of the current catch-effort data and additional biological data to be incorporated in order to apply different complementary methods for the estimation of MSY and other BRPs.

18. FReMP's view to sustainable use of marine fish resources will be based on moving towards precautionary[76] and adaptive[77] management approaches. This will be implemented through: a) Ensuring that the maximum fish production are below historical MSY estimates, as part of the Small Pelagics Fisheries Management Plan that also includes harvest control rules; b) assisting MMR to improve catch and effort data monitoring; and c) introducing up-to-date data analysis tools. The latter two will enable MMR to not only update the MSY, but beyond that to adopt more practical and diversified (i.e. specific to each fish category) fish resource management strategies and plans. Taking into account that baseline harvest levels are less than 50% of the lowest MSY estimate and harvests will only increase gradually during the project lifetime, the improved information becoming available will be used to adjust project / GoE strategies and plans where necessary (adaptive management).

Monitoring programme to address data and information gaps

19. *Data Analysis Approaches:* Several options are available for stock assessment of the small pelagics in Eritrean marine waters, given the amount and type of data availability: a) the first line of approach involve analysis of catch and effort data using surplus production models such as Schaefer and Fox to estimate MSY, on the basis time series catch and effort and resolved to species level, resulting into an estimate of MYS and corresponding fishing mortality rate; b) use of size frequency data with analytical approach to determine the growth parameters, mortality rates, exploitation rates and gear selectivity; c) application of other biological parameters such at size at massive maturity, size at first capture, sex ratio, length-weight relationship and recruitment estimates with cohort analysis to estimate standing stock biomass breeding population; d) scenario modelling to estimate the various Biological Reference Points (BRP) and MSY. FReMP will support capacity building of MMR and COMSAT to undertake stock assessment using a variety of these methods and approaches in both monitoring the fishery, verification of MSY and other BRPs. FReMP will also facilitate acquisition of the Information and Communication (ICT) and Database Management System (DBMS) to enable MMR and its partners to undertake directed stock assessment activities.

[76] The concept of precautionary management aims generally at improving conservation of the environment and the resources by reducing the risk of inadvertently damaging them. More specifically, it aims at helping decision-makers and regulators to take a safeguarding decision, when the scientific work is inconclusive but a course of action has to be chosen. In addition, it intends to promote a more equitable balance between the short-term considerations (which led to the present environmental degradation and overfishing) and long-term considerations such as the need to conserve resources for future generations.

[77] Adaptive management, is a structured, iterative process of robust decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. In this way, decision making simultaneously meets one or more resource management objectives and, either passively or actively, accrues information needed to improve future management

20. *Analysis Procedure:* The following procedure is proposed for data analysis: a) all data will have to be captured into the database at MMR; b) the database will be designed to query and extract the required datasets for further analysis; c) all size-frequency data by species will be entered into appropriate and suitable software to determine the population parameters, mortality rates, exploitation rates and impact of different boat-gear combinations; d) results from the preceding procedures to determine yields as proxies of MSY and MEY. At the same time, annual biomass will be estimated from CPUE and boat registration data; f) yield model and scenario analysis will then be used to estimate the various BRPs.

21. FReMP will therefore facilitate stock assessment procedures that will allow for the comparison of current value of each Biological Reference Point (BRP) with proposed Target Reference Points (TRP) and Limit Reference Points (LRP), which are more useful for implementing management measures. FReMP will support capacity building of MMR and collaborators to implement these procedures through capacity building and ICT/DBMS improvement. A number of fisheries specific software and internationally recommended free fisheries software will be acquired through FReMP support to implement these procedures. FReMP will support training of MMR and COMSAT staff in the use of contemporary stock assessment procedure, software and tools, exchange visits. FReMP will support TA in stock assessment twice a year and database development on an annual basis.

Recommendation on precautionary approach and production levels

22. Based on worldwide experiences in fish stock assessment, CPUE is associated with one of the highest uncertainty in natural resource management. A few minor errors may be magnified in proportions to the extent that the results become both unrealistic and un-usable in decision-making. To address some of these uncertainties, the best approach is to take precautionary approach and set the BRP to the most pessimistic level. Based on this principle, FReMP will adopt precautionary approach in setting the Target Biological Reference Point (BRP) for the small pelagic fishery at **19,000 tonnes** per year over a period of 7 years.

23. It is also evident that the oldest historical data and estimates are over 50 years while the latest is about 18 years old. Given the dynamics of fisheries and changes in effort over the years, the MSY estimated during these years may have changed considerably. It is a general scientific fact that MSY is not static and continue to change as the stocks get exploited. However, the level of fishing effort by Eritrean boats in the Red Sea has been reported to be very low with annual catches of about 10,000 tonnes. Based on this premise, taking a precautionary approach and setting the annual target BRP to 19,000 tonnes has adequate justification.

24. Based on the FAO Guidelines for Responsible fisheries, inadequacy of data is not an excuse for not managing any fishery sustainably and hence FReMP will adopt a precautionary approach in line with international standards in fishery management and set the target BRP at 19,000 tonnes per year over a period of 7 years.

25. With regard to climate change adaptation, the project will (i) create “climate buffers” by adopting an ecosystem approach to both marine and inland fisheries; (ii) promote natural resource use efficiency and alternative energy sources, e.g. multiple use of water in reservoirs, solar-powered ice making machines; (iii) maximize fish catch value and minimize waste; and (iv) ensure infrastructure and machines are resilient to changes in sea level, temperature, rainfall, etc. The programme will support the Integrated Coastal Area Management initiatives.

Pilot Mariculture Technologies

26. FReMP will pilot mariculture technologies at selected sites along the Red Sea coast, aiming to achieve the following: a) identify suitable sites and establish the feasibility of the selected species and systems; b) establish pilot programmes of which successful ones can serve as models for up-scaling; c) develop the science, technology and human resource base to support up-scaling of successful trials and establishment of extension, training and information systems. Details are provided in Annex 2 of this Appendix.

Table 2: Existing fish population parameters and indicators for the main small pelagics in the Red Sea, Eritrea (*Source: Fish Base*)

Description	Indicator/Symbol	*H. punctatus*[78]	*T. baelama*[79,80,81]	*E. heteroloba*[82,83]	*A. sirm*[84,85]	*E. teres*[86,25]
Length Measurement	**TL or SL**	SL	SL	TL	TL	TL
Maximum Length Observed	L_{max}	8.5	15	8	23	25
Asymptotic Length	L_{∞}	9.1	15.9	9.6	25.2	26.8
Asymptotic Weight	W_{∞}		44.2	5.2	76.3	1149
Growth Curvature	**K**			2.37	1.17	0.8
Age at Size Zero	t_o			-0.09	-0.14	-0.21
Natural Mortality Coefficient	**M**			4.66	2	1.35
Lifespan	L_o			1.2	2.4	3.5
Generation Time	**G**			0.5	0.7	1.1
Age at Massive Maturity	t_{m50}			0.4	0.6	0.9
Length at Massive Maturity	L_{m50}	6.1	10	6.4	15.1	16
Length at MSY	L_{MSY}	5.3	9.5	5.8	16.1	17.2
Constant in L-W Relationship	**a**		0.0048	0.0024	0.0025	0.043
Slope in L-W Relationship	**b**		3.3	3.4	3.2	3.8
Relative Yield per Recruit	**Y/R**			0.0289		0.037
Length at First Capture	L_c	3.6	6.4	3.8	10.1	10.7
Exploitation Rate at F=0.5	$E_{0.5}$	0.5	0.5	0.5	0.5	0.5
Exploitation Rate at MSY	E_{MSY}			0.63	0.62	0.62
Fishing Mortality at MSY	F_{MSY}			7.93	3.26	2.2
Optimum Exploitation Rate	E_{OPT}			0.57	0.56	0.55
Fishing Mortality at E_{OPT}	F_{OPT}			6.15	2.49	1.68
Productivity/Susceptibility	**PSA**			0.99	0.99	0.99
Internal Growth Rate	**r**			15.85	6.52	4.4
Length at Recruitment	L_r	3.6	6.4	3.8	10.1	10.7
Trophic Level	T_r			3.3	3.3	3.4
Annual Average Temperature	**Temp**			25	25	25
Food Consumption	**Q/B**		30.9	21.7	12.6	7.2

[78] Coppola, S.R., W. Fischer, L. Garibaldi, N. Scialabba and K.E. Carpenter. 1994. SPECIESDAB: Global species database for fishery purposes. User's manual. FAO Computerized Information Series (Fisheries). No. 9. Rome, FAO. 103 p.
[79] Abu Khair Mohammad Mohsin, Mohd. Azmi Ambak and Muhamad Nasir Abdul Salam. 1993. Malay, English, and scientific names of the fishes of Malaysia. Faculty of Fisheries and Marine Science, Universiti Pertanian Malaysia, Selangor Darul Ehsan, Malaysia, Occasional Publication No. 11.
[80] Bouhlel, M. 1988. Poissons de Djibouti. RDA International, Inc. California, USA.
[81] Whitehead, P.J.P., G.J. Nelson and T. Wongratana. 1988. FAO species catalogue. Vol. 7. Clupeoid fishes of the world (Suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, shads, anchovies and wolf-herrings. Part 2 - Engraulididae. FAO Fish. Synop. 7(125)Pt. 2:579 p.
[82] Al Sakaff, H. and M. Esseen. 1999. Occurrence and distribution of fish species off Yemen (Gulf of Aden and Arabian Sea). Naga, ICLARM Q. 22(1):43-47.
[83] Coppola, S.R., W. Fischer, L. Garibaldi, N. Scialabba and K.E. Carpenter. 1994. SPECIESDAB: Global species database for fishery purposes. User's manual. FAO Computerized Information Series (Fisheries). No. 9. Rome, FAO. 103 p.
[84] Sommer, C., W. Schneider and J.M. Poutiers. 1996. FAO species identification field guide for fishery purposes. The living marine resources of Somalia. FAO, Rome. 376 p.
[85] Sanders, M.J. and S.M. Kedidi. 1984. Stock assessment for the spotted Sardinella Sardinella sirm caught by purse seine adjacent to the border between Egypt and Sudan. Project for Development of Fisheries in Areas of the Red Sea and Gulf of Aden, UNDP/FAO RAB/83/023/04. Cairo. 28 p.
[86] Al Sakaff, H. and M. Esseen. 1999. Occurrence and distribution of fish species off Yemen (Gulf of Aden and Arabian Sea). Naga, ICLARM Q. 22(1):43-47.

Table 3: The species group for small pelagics, large pelagics and demersal fisheries in the Red Sea, Eritrea.

SN	Species name	Author	Group	Family	Taxonomic Status	Group
1.0	***Herklotsichthys quadrimaculatus***[87]	Ruppell, 1837	Spotback herring	Clupeidae	New combination	Small pelagic
1.1	*Clupea quadrimaculata*	Ruppell, 1837	Spotback herring	Clupeidae	Original combination	Small pelagic
1.2	*Harengula bipunctata*	Valenciennes, 1847	Spotback herring	Clupeidae	Junior synonym	Small pelagic
2.0	***Thrissa baelama***[88,89,90]	Forskal, 1775	Baelama anchovy	Engraulidae	New combination	Small pelagic
2.1	*Clupea baelama*	Forskal, 1775	Baelama anchovy	Engraulidae	Original combination	Small pelagic
2.2	*Engraulis baelama*	Forskal, 1775	Baelama anchovy	Engraulidae	New combination	Small pelagic
2.3	*Scutengraulis baelama*	Forskal, 1775	Baelama anchovy	Engraulidae	New combination	Small pelagic
2.4	*Thrissina baelama*	Forskal, 1775	Baelama anchovy	Engraulidae	New combination	Small pelagic
2.5	*Thrissicles baelama*	Forskal, 1775	Baelama anchovy	Engraulidae	New combination	Small pelagic

[87] Coppola, S.R., W. Fischer, L. Garibaldi, N. Scialabba and K.E. Carpenter. 1994. SPECIESDAB: Global species database for fishery purposes. User's manual. FAO Computerized Information Series (Fisheries). No. 9. Rome, FAO. 103 p.

[88] Abu Khair Mohammad Mohsin, Mohd. Azmi Ambak and Muhamad Nasir Abdul Salam. 1993. Malay, English, and scientific names of the fishes of Malaysia. Faculty of Fisheries and Marine Science, Universiti Pertanian Malaysia, Selangor Darul Ehsan, Malaysia, Occasional Publication No. 11.

[89] Bouhlel, M. 1988. Poissons de Djibouti. RDA International, Inc. California, USA.

[90] Whitehead, P.J.P., G.J. Nelson and T. Wongratana. 1988. FAO species catalogue. Vol. 7. Clupeoid fishes of the world (Suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, shads, anchovies and wolf-herrings. Part 2 - Engraulididae. FAO Fish. Synop. 7(125)Pt. 2:579 p.

3.0	***Encrasicholina heteroloba***[91,92]	Ruppell, 1837	Shorthead anchovy	Engraulidae	New combination	Small pelagic
3.1	*Engraulis heteroloba*	Ruppell, 1837	Shorthead anchovy	Engraulidae	Original combination	Small pelagic
3.2	*Anchoviela heteroloba*	Ruppell, 1837	Shorthead anchovy	Engraulidae	New combination	Small pelagic
3.3	*Stolephorus heterolobus*	Ruppell, 1837	Shorthead anchovy	Engraulidae	New combination	Small pelagic
3.4	*Encrasicholina heterolobus*	Ruppell, 1837	Shorthead anchovy	Engraulidae	New combination	Small pelagic
3.5	*Amentum heterobolum*	Ruppell, 1837	Shorthead anchovy	Engraulidae	New combination	Small pelagic
4.0	***Amblygaster sirm***[93,94]	Walbaum, 1792	Spotted sardinella	Clupeidae	New combination	Small pelagic
4.1	*Clupea herengus sirm*	Walbaum, 1792	Spotted sardinella	Clupeidae	Original combination	Small pelagic
4.2	*Clupea sirm*	Walbaum, 1792	Spotted sardinella	Clupeidae	New combination	Small pelagic
4.3	*Sardinella sirm*	Walbaum, 1792	Spotted sardinella	Clupeidae	New combination	Small pelagic
5.0	***Etrumeus teres***[95,25]	DeKay, 1842	Round herring	Clupeidae	New combination	Small pelagic
5.1	*Alosa teres*	DeKay, 1842	Round herring	Clupeidae	Original combination	Small pelagic
	Dussumieria acuta	Valenciennes, 1847	Rainbow sardine	Cluipeidae		Small pelagic
6.0	***Scomberomorus commerson***	Lacepede, 1800	Spanish mackerel	Scombreidae		Large Pelagics
7.0	***Rastrelliger kanagurta***	Curvier, 1816	Indian mackerel	Scombreidae		Large Pelagics
8.0	***Euthynnus affinis***	Cantor, 1849	Kawa	Scombreidae		Large Pelagics
9.0	***Thunnus tonggol***	Bleeker, 1851	Longtail tuna	Scombreidae		Large Pelagics
10.0	***Auxis thazard***	Lacepede, 1800	Frigate tuna	Scombreidae		Large Pelagics
11.0	***Saurida spp***	Scopoli, 1777	Big-eyed lizardfish	Synodontidae		Demersals
12.0	***Nemipterus spp.***	Swainson, 1839	Threadfin Breams	Nemipteridae		Demersals
13.0	***Sphyraena spp.***	Artedi in Rose, 1793	Barracuda	Sphyraenidae		Demersals
14.0	***Lutjanus gibbus***	Forsskal, 1775	Hempback Red Snapper	Lutjanidae		Demersals
14.1	*L. argentimaculatus*	Forsskal, 1775	Mangrove Red Snapper	Lutjanidae		Demersals

91 Al Sakaff, H. and M. Esseen. 1999. Occurrence and distribution of fish species off Yemen (Gulf of Aden and Arabian Sea). Naga, ICLARM Q. 22(1):43-47.

92 Coppola, S.R., W. Fischer, L. Garibaldi, N. Scialabba and K.E. Carpenter. 1994. SPECIESDAB: Global species database for fishery purposes. User's manual. FAO Computerized Information Series (Fisheries). No. 9. Rome, FAO. 103 p.

93 Sommer, C., W. Schneider and J.M. Poutiers. 1996. FAO species identification field guide for fishery purposes. The living marine resources of Somalia. FAO, Rome. 376 p.

94 Sanders, M.J. and S.M. Kedidi. 1984. Stock assessment for the spotted Sardinella *Sardinella sirm* caught by purse seine adjacent to the border between Egypt and Sudan. Project for Development of Fisheries in Areas of the Red Sea and Gulf of Aden, UNDP/FAO RAB/83/023/04. Cairo. 28 p.

95 Al Sakaff, H. and M. Esseen. 1999. Occurrence and distribution of fish species off Yemen (Gulf of Aden and Arabian Sea). Naga, ICLARM Q. 22(1):43-47.

14.2	*L. janthinurepterus*	Forsskal, 1775	Yellowstreaked Red Snapper	Lutjanidae		Demersals
14.3	*L. sanguineus*	Cuvier, 1828	Humphead Blood Snapper	Lutjanidae		Demersals
15.0	***Epinephelus faveatus***	Valenciennes, 1828	Barred Chest Grouper	Serranidae		Demersals
16.0	***Cephalopholis argus***	Bloch & Schneider, 1801	Peacock Hind Rock Cod	Serranidae		Demersals
17.0	***E. latifasciatus***	Temminck & Schlegel,	Stipped Grouper	Serranidae		Demersals
17.1	*E. summana*	Forsskal, 1775	Summan Grouper	Serranidae		Demersals
17.2	*E. areolatus*	Forsskal, 1775	Areolate Grouper	Serranidae		Demersals
17.3	*E. maculatus*	Bloch, 1790	Highfin Grouper	Engraulidae		Demersals

Table 4: The catch-per-unit-effort of the artisanal boats by craft-gear combination.

Sambuk with gill net/hook and line	715 kg $trip^{-1}$	71.5-59 kg day^{-1}
Sambuk with gillnet	804 kg $trip^{-1}$	80.5-67 kg day^{-1}
Sambuk with hook and line	854 kg $trip^{-1}$	85.4-71 kg day^{-1}
Houri with hook and line	800 kg $trip^{-1}$	80 kg day^{-1}

Table 5: Theoretical approach to stock assessment using analytical/yield analysis

Indicator	Measurements of the current position of the fishery for each objective	• State, e.g. stock biomass, B_{now} ; total catch estimated from length-frequency analysis (VPA) or CAS • Pressure, e.g. fishing effort; fishing mortality, *F* estimated from length-frequency analysis (There was inadequate time series data to use CPUE/Surplus Production Models) • Based on estimates of total mortality (Z) and natural mortality (M)
Technical reference points	Explicit mathematical definitions and/or procedures for use as targets or limits reference points	• MSY-based, e.g. B_{MSY}, F_{MSY}, as proposed by the UN Convention on the Law of the Sea, now usually recommended as limit reference points, not targets; • Since there was inadequate data to estimate biomass directly from CPUE/Surplus Production Model, length-frequency analysis was used to estimate Biomass Proxies[1] for MSY, e.g. $F_{0.1}$, F_{MAX}; • Protection of reproductive capacity, e.g. $F_{\%SPR}$, also often used as limit reference points. $F_{20\%SPR}$ is *F* giving a spawning stock biomass per recruit (SPR) of 20% of the un-fished level • Other possible limit reference points: ○ Multispecies, e.g. permitted bycatch levels; ○ Economic and social, e.g. F_{MEY}
Stock status and Scenarios	Measure the current state of the fishery relative to the associated reference points[96, 97]	• B_{CURR} / B_{MSY} • F_{CURR} / F_{MSY} • $Yield_{-per-}R/FishB_o$ (at F_{CURR}) • $Yield_{-per-}R/SSB_o$ (at F_{CURR}) • $Yield_{-per-}R/FishB_o$ (at F_{MSY}) • $Yield_{-per-}R/SSB_o$ (at F_{MSY}) •

Where:

i)	B_{CURR}	: Current estimated biomass at steady state
ii)	B_{MSY}	: Estimated biomass at MSY
iii)	F_{CURR}	: Current annual fishing mortality coefficient
iv)	F_{MSY}	: Estimated annual fishing mortality at MSY
v)	$Yield_{-per-}R$	: Yield per Recruit
vi)	$FishB_{CURR}$ (at F_{CURR})	: Fishable biomass at current fishing mortality coefficient
vii)	SSB_{CURR} (at F_{CURR})	: Spawning stock biomass at current fishing mortality coefficient
viii)	$FishB_o$ (at F_{MSY})	: Fishable biomass at maximum fishing mortality coefficient
ix)	SSB_o (at F_{MSY})	: Spawning stock biomass at maximum fishing mortality coefficient

[96] Proxy reference points are used when the preferred reference points cannot be calculated, e.g. due to unavailable data.

[97] B_{MSY} is stock size (B) giving the maximum sustainable yield (MSY) in a production model (i.e. the highest point in the yield curve).

Table 5: Analysis procedure for the stock assessment based on Survey Data/CAS Data/Frame Survey Data

Data Type/Input	Analysis	Outputs
Length-Frequency	**FiSAT (ELEFAN I)/MRAG-LFDA**	**L_c, L_∞ and K**
Length-Frequency	**FiSAT (Length-Converted Catch-Curve)/LFDA**	**Z**
L_∞ and K		**M and F**
T °C		**E_{CURR}**
F/Z (Calculated)		
Length-Frequency	**FiSAT (Probability of Capture)**	**Probability Table**
L_∞		
K		
Length-Frequency	**FiSAT (Gear Selection (Knife Edge)**	**L_{25}**
L_∞		**L_{50}**
K		**L_{75}**
Length-Frequency	**FiSAT (Beverton & Holt Y/R and B/R - Analytical)**	**E_{MSY}**
L_∞/K		**$E_{F0.1}$**
M/K (Calculated)		**E_{opt}**
L_c/L_∞(Calculated)		
Length-Frequency	**FiSAT (Virtual Population Analysis)**	**B_{CURR} (Steady State)**
L_∞		
K		
M		
F_t		
a (L-W Relationship)		
b (L-W Relationship)		
B_{CURR} (FiSAT)	**FiSAT (Biomass Estimates (CAS or VPA))**	**SSB_{CURR}**
Total Catch (CAS)		**$SSB_{HARVESTED}$**
Sex Ratio		**Total Catch · q = SSB_{CURR}**
SSB_{CURR}	**Yield Model (MRAG)**	**$Yield_{-per-}R/FishB_{CURR}$ (at F_{CURR})**
L_∞		**$Yield_{-per-}R/SSB_{CURR}$ (at F_{CURR})**
K		**$Yield_{-per-}R/FishB_o$ (at F_{MSY})**
M		**$Yield_{-per-}R/SSB_o$ (at F_{MSY})**
L_c		**F_{CURR}**
L_{m50}		**F_{MSY}**
a (L-W Relationship)		**$F_{0.1}$**
b (L-W Relationship)		
a (SR Relationship)		
b (SR Relationship)		

Profile of the Most Common Pelagic Fish Species from the Red Sea, Eritrea

27. *Small-Pelagic Species Profile:* They are small pelagic fishes (15-25cm) are mainly Clupeidae (Sardines and Herrings/Anchovies) Many are shoaling species of great importance to fisheries as food and as bait. They constitute a larger proportion in the estimated MSY of the Eritrean waters together with other small pelagic species. More than 25,000 mt of small pelagic landings were recorded in 1960s from Eritrean waters. A profile of some of the most common species is provided below:

a) Spotted Sardinella
Belem/Aida

Name:	*Amblygaster sirm* (Walbaum, 1792)
Original combination:	*Clupea herengus sirm* (Walbaum, 1792)
New Combination:	*Clupea sirm* (Walbaum, 1792)
New Combination:	*Sardinella* sirm (Walbaum, 1792)
Size:	Maximum total length 23 cm
Distribution:	Coastal pelagic waters along the entire Eritrean waters
Major fishing grounds:	Beilul, Barasole, Tio, Assab bay, Eddi, Harmil**,** Dehalak, Dohul
Fishing methods:	Gill nets, seines and shallow trawls.
Habitat & Biology:	Coastal pelagic species
Peak season:	November to March
Commercial interest:	Marketed fresh or frozen. Used also as bait.

b) Rainbow sardine
Belem/Aida

Name:	*Dussumieria acuta* (Valenciennes, 1847)
Size:	Maximum total length 20cm
Distribution:	**I**nshore pelagic waters along the entire Eritrean waters
Major fishing grounds:	Beilul, Barasole, Tio, Assab bay, Eddi, Harmil**,** Dehalak area (Maeni), Dohul
Fishing methods:	Seines and also shallow trawls.
Habitat & Biology:	A pelagic inshore species
Peak season:	November to March
Commercial interest:	Marketed fresh, dried-salted or frozen.

c) Goldstripe Sardinella
Belem/Aida

Name:	*Sardinella gibbosa* (Bleeker, 1849)
Synonym:	*Clupea gibbosa* (Bleeker, 1849)
Original name:	*Clupea baelama* (Forsskal, 1777
New Combination:	*Thrissa baelama* (Forsskal, 1775)
Size:	Max total length 17cm –23cm
Distribution:	Coastal pelagic waters along the entire Eritrean waters
Major fishing grounds:	Beilul, Barasole, Tio, Assab bay, Eddi, Harmil**,** Dehalak, Dohul
Fishing methods:	Seines gill nets and shallow trawls.
Habitat & Biology:	A pelagic inshore species
Peak season:	November– April
Commercial interest:	Marketed fresh and dried salted.

d) Bluestripe herring
Aburas/Aida/Belem

Name:	*Herklotsichthys quadrimaculatus* (Ruppel, 1837)
Original Combination:	*Clupea quadrimaculata* (Ruppel, 1837)

Junior Synonym:	*Harengula bipunctata* (Valenciennes, 1847
Size:	Max total length 14cm
Distribution:	**C**oastal pelagic waters along the entire Eritrean waters
Major fishing grounds:	Beilul, Barasole, Tio, Assab bay, Eddi, Harmil**,** Dehalak, Dohul
Fishing methods:	**S**eines lift nets and shallow trawls.
Habitat & Biology:	A pelagic coastal species
Peak season:	November to April
Commercial interest:	Marketed fresh and dried salted; also used as bait.

e) Shorthead anchovy
Wedif/Belem/Aida

Name:	*Stolephorus heterolobus* (Ruppel, 1837)
Original Combination:	*Engraulis heteroloba* (Ruppel, 1837)
New Combination:	*Anchoviela heteroloba* (Ruppel, 1837)
New Combination:	*Encrasicholina heteroloba* (Ruppel, 1837)
New Combination:	*Encrasicholina heterolobus* (Ruppel, 1837)
Size:	Max total length 8cm
Distribution:	Coastal pelagic waters along the entire Eritrean waters
Major fishing grounds:	Beilul, Barasole, Tio, Assab bay, Eddi, Harmil**,** Dehalak, Dohul
Fishing methods:	Seines, lift nets and shallow trawls.
Habitat & Biology:	A pelagic coastal species. One of the commonest species.
Peak season:	
Commercial interest:	Marketed fresh or dried salted.

f) Baelama anchovy
Belem/Aida

Name:	*Thryssa baelama* (Forsskal, 1775)
Original combination	*Clupea baelama* (Forskal, 1775)
New combination	*Engraulis baelama* (Forskal, 1775)
New combination	*Scutengraulis ba*el*ama* (Forskal, 1775)
New combination	*Thrissina baelam*a (Forskal, 1775)
New combination	*Thrissicles baelama* (Forskal, 1775)
Size:	Maximum total length 11cm
Distribution:	Coastal pelagic waters along the entire Eritrean waters
Major fishing grounds:	Beilul, Barasole, Tio, Assab bay, Eddi, Harmil**,** Dehalak, Dohul
Fishing methods:	Seines, lift nets and shallow trawls.
Habitat & Biology:	A pelagic coastal species
Peak season:	November- April
Commercial interest:	Marketed fresh and dried salted

SYMBOLS, ACRONYMS AND ABBREVIATIONS USED IN STOCK ASSESSMENT

a	Constant in L-W Relationship
b	Slope in L-W Relationship
B/R	Average Biomass per Recruit
BAC	Boat Activity Coefficient
B_{CURR}	Current estimated biomass at steady state
B_{MSY}	Estimated biomass at MSY
BRP	Biological Reference Point
CAS	Catch Assessment Survey
CEDA	Catch Effort Data Analysis
CPUE	Catch per Unit Effort
DBMS	Database Management System
$E_{0.5}$	Exploitation Rate at F=0.5
E_{CURR}	Current exploitation rate
ELEFAN	Electronic Length Frequency Analysis
E_{MSY}	Exploitation Rate at MSY
E_{OPT}	Optimum Exploitation Rate
$F_{\%SPR}$	Fishing mortality at percent spawning biomass
$F_{0.1}$	Fishing Mortality at Maximum Economic Yield (MEY)
$F_{20\%SPR}$	F giving a spawning stock biomass per recruit of 20% of the original
F_{CURR}	Current annual fishing mortality coefficient
FiSAT	Fisheries Stock Assessment Tools
$FishB_{CURR}$ (at F_{CURR})	Fishable biomass at current fishing mortality coefficient
$FishB_o$ (at F_{MSY})	Fishable biomass at maximum fishing mortality coefficient
F_{MSY}	Estimated annual fishing mortality at MSY
F_{MSY}	Fishing Mortality at MSY
F_{OPT}	Fishing Mortality at E_{OPT}
FS	Frame Survey
G	Generation Time
ICT	Information and Communication
K	Growth Curvature
L_{25}	25% gear selectivity length
L_{50}	50% gear selectivity length
L_{75}	75% gear selectivity length
L_c	Length at First Capture
LCA	Length Cohort Analysis
LFDA	Length Frequency Data Analysis
L_{m50}	Length at Massive Maturity
L_{max}	Maximum Length Observed
L_{MSY}	Length at MSY
L_o	Lifespan
L_r	Length at Recruitment
L_∞	Asymptotic Length
M	Natural Mortality Coefficient
MEY	Maximum Economic Yield
MRAG	Marine Resource Assessment Group
PSA	Productivity/Susceptibility
Q/B	Food Consumption
r	Internal Growth Rate
SB	Stock Biomass
SL	Standard Length
SPR	Spawning stock biomass per recruit
SR	Stock Recruitment
SSB	Spawning Stock Biomass
SSB_{CURR} (at F_{CURR})	Spawning stock biomass at current fishing mortality coefficient
SSB_o (at F_{MSY})	Spawning stock biomass at maximum fishing mortality coefficient.
Temp	Annual Average Temperature
TL	Total Length
t_{m50}	Age at Massive Maturity
t_o	Age at Size Zero
T_r	Trophic Level
VPA	Virtual Population Analysis
W_∞	Asymptotic Weight
Y/R	Relative Yield per Recruit
$Yield_{-per-}R$	Yield per Recruit
Z	Total mortality coefficient

Annex 1: Marine Cage Culture of Groupers (Example of Orange Spotted Grouper)[98]

***Epinephelus coioides* Hamilton, 1822 [Serranidae]**

FAO Names:
En - Orange-spotted grouper
Fr - Mérou taches oranges
Es - Mero de pintas naranjas

Technology Description

1. The technology of cage culture is relatively cheap and easy to run. The materials used in construction are indigenous and readily available like the bamboo supports. Filipinos are used to working with bamboo. In addition, grouper fry can now be produced in hatcheries or transported from areas where fry collection is an established industry, and there are a lot of places in the country where this is so.
2. Marine cage culture of grouper can be done in 4- to 12-compartment cage as one unit. There are nursery (small mesh is used in the cage) and grow-out phases (larger mesh). Grouper need to be sorted and size-graded every week. Other routine procedures include feeding (trash fish and/or formulated feeds), net maintenance, stock sampling, and monitoring water quality.
3. Groupers can reach the market-size of 400-600 g in 6-8 months when 2.5-7.5 cm fry are stocked. The live export market has the best price to offer.

Technology Profile

4. Construct floating net-cages, usually of size 5 x 5 x 3 m, and having 4 to 12 compartments. Attach floats (plastic drums, barrels) and sinkers or anchors (concrete blocks, etc.). For the nursery cage, use a 0.5 to 1 cm mesh; for grow-out, use a 2-5 cm mesh. Place hides and shelters inside the netcage; these may be made of sawed bamboo tied in triangular bundles.

5. Stock wild- or hatchery-reared fry (2-10 cm length) in nursery cages at 100-200 per m3. Install hover-type lamp to attract copepods and other young fishes and crustaceans; these can be eaten by the grouper. But give added feed like mysid shrimps or finely chopped trash fish at 10% of fish biomass. Feeds are divided and given 2-4 times a day. If formulated feed is also used, go with the directions in the manufacturer's label. Do not overfeed; pollution can bring a fish kill.

6. Sort, size-grade, or thin out stock every week. Transfer same-sized grouper to the next vacant cage. When groupers are twice as big as initially stocked, they can be considered in the grow-out phase.

7. Do the same procedures as in the nursery: feed (reduced to 5% because large fish are over their growth spurt), size-grade and transfer, monitor water quality, change the nets at least once a month, sample the stock, and monitor fish for diseases and parasites.
8. Selectively harvest the 400-g or bigger groupers. Do not give feeds a day prior to harvest.

Technology Description of Marine Pond Culture of Grouper

9. Grouper is a high-value species like tiger shrimp, and with prudent pond management, it is easier to culture without the attendant disease problems with prudent pond management. Shrimp farmers seeking alternative crops have found one in grouper.

10. Preparing the ponds for grouper is similar to milkfish and shrimp pond preparation. In addition, grouper fry or "tiny" need to be nursed first and must be regularly sorted and size-graded. Rectangular netcages supported by bamboo poles and installed inside the pond can serve as nursery. A hover-type lamp can attract live food for the grouper fry. Nursery takes about a month.

11. At the same time that grouper fry is stocked in the nursery, adult tilapia are released into grouper grow-out ponds so these, too, have a month to reproduce. Tilapia fingerlings will then serve as prey to grouper fingerlings from the nursery. In addition to tilapia, chopped trash fish and/or a formulated feed for carnivorous species may be given to grouper.

[98] www.seafdec.org.ph/2011/marine-pond-**culture-of-grouper**/- Accessed on 22/06/2016

12. Regular monitoring and water changes are part of the pond routine for taking care of the stock. Grouper takes 5-7 months to attain a market-size of 400-800 g. If marketed live, fish farmers need to install temporary nets and tanks where grouper can be held while awaiting buyers and the completion of live packing for transport.

Technology Profile

- Prepare the ponds like you would for milkfish. Stock adult tilapia at 5,000 to 10,000 per ha; its fingerlings will later serve as food for grouper.
- Install nursery cages if 2-3 cm fry are the only ones available for stocking the grow-out ponds. Bigger-sized fish (5-10 cm) can be stocked directly. Rectangular netcages can be used, and these are kept upright with bamboo or wooden support. Cage size varies, from 4 x 2 x 1.5 m to 8 x 4 x 1.5 m. Net mesh size is 0.5 cm. Stocking density is 60 fry per m^3
- Install 50-watt incandescent, hover-type lamp in every cage, about a foot above the waterline, to attract mysids, copepods, and other young fishes and crustaceans at night. These are live food for the grouper fry, although they may also be given finely-chopped trash fish and/or mysid shrimps or “alamang.”
- Sort and grade the fry weekly to minimize competition for space and food and prevent cannibalism. Make sure there are extra netcages for the sorted stock.
- Transfer fry to grow-out pond when they are bigger, about 5-10 cm, usually after 30-45 days in the nursery. Stock at 5,000 per ha.
- Check if there are already tilapia fingerlings in the pond. There may be a need to feed more, so give chopped trash fish at the rate of 5% of grouper biomass per day. Give half of the feed in the morning, the rest in the afternoon. Place half in a feeding tray for monitoring purposes, and broadcast the rest. If using formulated feeds, take the advice on the feed label. Overfeeding leads to rapid deterioration of water quality.
- Do the routine pond activities: monitor water parameters (dissolved oxygen, salinity, temperature, depth), change water as the tide dictates, take weight-length measurements of some of the stock so that feeding can be adjusted.
- Selectively harvest in 5-7 months when some of the grouper are already market-sized (400 to 800 g). Harvest by using modified liftnets placed at the pond bottom. Provide shelters like sawed-off bamboos or PVC pipes in the middle of the net. Carefully lift the net in early morning when most of the grouper hide themselves there. Take only the biggest fishes and transfer to a pre-installed net that is 4 x 8 x 1.5 m with 1-2 cm mesh size. Stock the harvested grouper at 20 per m^3
- To pack live grouper for transport, place 3-5 fish inside double-sheeted plastic bags with enough water to cover the nostrils of the grouper. Close the bags and pack in standard styrofoam boxes. Place crushed ice on top of the plastic bags to keep fish cool.

Appendix 15: Status of Inland Fisheries in Eritrea

Introduction

1. Eritrea's fisheries sector has traditionally been dominated by marine resources from the Red Sea. The potential for inland fisheries has only received serious attention in the past two or three decades, notably after independence with the setting up of an inland fisheries unit within the Ministry of Marine Resources (MMR) in 1994. Further effort in this direction came in 2008 with establishment of MMR branches in the inland zobas of Maakel, Debub, Gash Barka and Anseba. The MMR zoba branches serve the purpose of regulating fish products (inspection and licensing for quality and safety assurance) and development of inland fisheries resources (such as stocking dams with selected fish and monitoring their performance). An inland fisheries research centre was established in Mai-Sirwa near Asmara in 2000, to support development of inland fisheries particularly by producing fish fingerlings to re-stock the reservoirs.

2. The inland fisheries is based entirely on artificial water resources since Eritrea has no perennial rivers, natural lakes or other permanent fresh water bodies. About 330 water reservoirs[99] and dams have been constructed in both highland and lowland parts of the country principally for irrigation and water supply for domestic needs. The dams vary widely in size and depth, ranging from less than 30,000 m³ for the smallest ones while the largest exceed 70,000,000 m³ in installed capacity. Most of the reservoirs are of compacted earth dams, however some of the larger ones are concrete dams. All the reservoirs receive water mainly by means of direct rainfall, temporary rivers and streams during the rainy season, usually falling in the summer from June to September, and most of them are able to hold water till the next rainy season; these, therefore, serve as perennial water resources. The Government of Eritrea plans to construct more water reservoirs across the country to reduce the impacts of recurrent drought.

3. The primary uses of the reservoirs for agriculture and domestic purposes impose limits on the extent to which they can serve for fisheries and aquaculture. For instance irrigation reservoirs stand the risk of drying up in years of drought, while organic fertilization cannot be freely added in reservoirs that have a dual purpose of providing water for human consumption. The water reservoirs are mostly situated in the highland areas above 1800m altitude, consequently the low to moderate water temperature may affect the potential productivity of stocked warm water fish species. Generally the dams have not incorporated fisheries protection into their operating rules because fisheries is not their priority.

Fisheries status

4. About 71 of Eritrea's water reservoirs are stocked with fish species, which have been introduced at different times over the past seven decades. Generally all the large water reservoirs (capacity greater than 1,000,000 m^3), and most medium dams (capacity 500,000 m^3 - 1,000,000 m^3) are already stocked with fish. Some of the dams of capacity exceeding 100,000 m^3, and which can sustain water at least for one year in the worst droughts, have also been stocked. Reservoirs with capacity of less than 70,000 m^3 generally may not hold water throughout the year and are given low priority in stocking decisions. These usually are shallow water bodies, an average depth below 4 m, therefore have a high risk of drying up and may face low oxygen and high nutrient concentration during the warm months as the water reduces. The complete list of stocked dams is presented in Table 1.

5. Fish stocking started in the 1940s during Italian colonial period mainly with Common Carp (*Cyprinus carpio*), catfish (*Clarias spp.*) and in some places eel (*Anguilla anguilla*). Catfish and common carp have persisted in some reservoirs where they seem to breed and grow normally but eel is likely to have disappeared long ago as they do not breed in fresh water and need to migrate to the ocean for spawning. Further fish introductions took place during Ethiopian regime and continued after independence in 1990s with MMR stocking and re-stocking more dams during the past decade. The species socked in the latter years included Crucian carps (*Carassius carassius),* Goldfish *(Carassius auratus) and* two Tilapia species (*Oreochromis niloticus and Tilapia zilli)*. *Garra species* (probably

[99] The terms water reservoirs and dams are used interchangeably in the context of Eritrea's inland water system

Garra waterloti), Labeo species and *Barbus* species are also found in the reservoirs but it is not clear how and when they got into the water system. There are reports that in some dams, fish, especially cat fish, has apparently been introduced through downstream floods in between dams. *Garra species* though is thought to be Eritrea's only indigenous freshwater species.

Fisheries potential

6. The Ministry of Marine Resources, through the Zoba branches, has been monitoring fisheries status in the water reservoirs (Table 1 indicates some of the dams that have been checked). The results are very encouraging, showing that some species are established and reproducing well. In particular tilapia and carps seem to be dominant in most dams while cat fish is significant. For instance a trial catch assessment (not based on probability sampling) done by MMR Zoba Anseba in 2011 realized a total catch of 550 kg of fish from 3 Elabered Dams in 3 days, consisting of tilapia, carp and catfish. More revealing was the sizes of fish existing in the dams, with the largest size of catfish caught weighing 7.1 Kg, tilapia 1.5 Kg and Carp 2.1 Kg. There is need for continuous and better designed experiments to produce more accurate information on the status of fish stocks in the water reservoirs, their composition and biological parameters.

7. The inland fisheries potential is often estimated at around 100 - 150 tonnes per year (based on estimation made in 1993). However, a more recent assessment of 20 reservoirs stocked with different species indicated an average water surface area of 24.5 ha per dam and mean potential yield of 50.6 Kg/ha/year (See Table 2). This production level is quite consistent with the average yields of other water reservoirs in Africa that are subject to moderate to heavy fishing activity. The average yield for large African reservoirs is reported as 27-65 kg/ha/year[100], while medium-sized reservoirs have a mean yield of approximately 80 kg/ha/year[101]. A mean yield of 50.6 Kg/ha/year will therefore produce approximately 4.9 tons from an average dam per year (See calculation in Table 2). This translates to approximately 348 tons per year for the 71 dams already stocked with fish and about 1,610 tons if all 330 existing dams were stocked with fish.

8. On average, the 15 dams selected for the programme can produce at least 74 tons of fish per year. However, the programme will give priority to those dams with higher potential for fisheries (a key selection criteria for dams under the programme) and yields can be increased further through improved dam management. Therefore conservative estimates of **100 tons** per year from the programme intervention dams is realistic with intensification of dam management. At the current per capita fish consumption for Eritrea of 0.4 Kg per year, fish produced from FReMP dams can feed 250,000 additional people, which is a significant proportion of the country's rural population. Fish from all currently stocked dams can feed 870,000 people while the entire inland fisheries has potential to feed over 4 million Eritrean's at the current levels of per capita fish consumption. The inland fisheries therefore stands to make important contribution in domestic fish consumption.

Fishing activity

9. Despite this potential the inland fisheries are largely unexploited and inland capture production has always been reported as zero in national catch statistics[102]. Similarly inland aquaculture has some potential but the statistics do not show any catches. There is very little, if any, fishing activities taking place in inland water reservoirs. Rudimentary fishing activities have been reported in some reservoirs, for example in Elabered and Adi Sheka a few fishermen, but only occasionally, caught catfishes and carps using baited hook and line on bamboo poles. In some water reservoirs some local people sporadically used hooks and mosquito nets especially in the shallow areas. There are reports of some people resorting to technique of enclosing tilapia in shallow bays and then catching them by hand. Along the Gash River guddling (groping by hand) for catfish has been reported to occur. In order to promote utilization of fisheries for subsistence the Ministry of Fisheries in 1998 distributed hooks and lines on a trial basis to some local communities in nine reservoirs. However this onetime event was not followed up with awareness creation, skills development and extension support and therefore did

[100] Kaspersky, J.M. 1986. Management of Fisheries on Large African Reservoirs - an Overview. In: Reservoir Fisheries Management: Strategies for the 80's. American Fisheries Society (eds G.E. Hall and M.J. Van Den Avyle). Bethesda, Maryland, U.S.A. Pp. 28-38.
[101] Van der Knapp, M., 1994. Status of Fish Stocks and Fisheries of 13 Medium-sized African Reservoirs. CIFA Tech. Pap. No. 26. FAO, Rome. 107p.
[102] For example FAO (2015). Fisheries and Aquaculture Country Profile for Eritrea

not produce significant effect in terms of fishing activity, increased fish production and consumption by the local communities.

10. With so little fishing activity, there is no recognizable markets for fresh-water fisheries in Eritrea. Consumption and culturing practices of fresh water fishes have not yet developed in the rural communities. There have been some reports of fried catfish fillet and tilapia being sold to communities around Elabered who ate them. Though the market for freshwater fish can hardly be said to exist, it seems that the most acceptable species are catfish and tilapia, while local communities consider common carp as too bony to eat. Where it is found, the *Garra species* is also not preferred due to its very small size (usually about 100 grams). The people in the urban areas have been used to eating marine fisheries and it may take long to change the eating habit and embrace fresh water fish. Therefore in the short-term the potential freshwater fish market may be limited to areas around water reservoirs, other remote rural areas and small towns where sea fish is not available.

Key development issues for inland fisheries

11. Major development challenges for dam fisheries include; (i) the multiple uses of water reservoirs principally for agriculture, livestock and domestic purposes, which therefore limit their full development for fisheries. Sometimes irrigation water pumped out may also carry with it fish eggs and fish fry, thus depleting the potential future stocks. The dams have not incorporated fisheries protection criteria into their operating rules because fisheries is not their priority; (ii) The dams have been stocked with fish without management plans for the fisheries, consequently issues of managing water quality and quantity sufficiently to sustain fisheries are likely to arise unless management plans are developed and implemented. This includes measures to reduce impacts on fisheries such as siltation, floods and drought, or in extreme cases, of dams drying up; (iii) Some of the dams are stocked with fish but have not been assessed to determine the fish status, species characteristics and production potential. In some cases fish apparently has been introduced in dams through downstream flooding which did not allow for proper stocking procedures; (iv) Some dams lack basic infrastructure such as access roads and power supply and therefore difficult to monitor. In such cases it may not be easy to utilize the fisheries; (v) There is little awareness among local communities about the nutritional benefits of fish while their preferences among the freshwater fishes is not fully understood; (vi) Local communities also lack the skills, experience and equipment for fishing, fish handling and preparation of various fish products and recipes; (vii) The post-harvest system for fresh water fisheries is undeveloped and consequently low demand and market prices of freshwater fishes may be expected in the short term. As a result the most reasonable immediate action might be to utilize the existing fish stocks starting with low cost actions such as making fishing gear available on a commercial basis and training how to catch, preserve and sell fresh fish locally. The utilization activities will be intensified as demand for fresh water fisheries increases.

12. Subcomponents 1.2 and 1.3 of FReMP are designed to address many of the challenges faced by the inland fisheries.

Table 1: Stocked water reservoirs

Zoba	Name of Reservoir	Capacity (M^3)	Species stocked	Status
Gash Barka	Gerset	60,000,000	tilapia, catfish, labeo	Checked, not harvested
	Fanko-xmue	10,000,000	catfish, labeo	Checked, not harvested
	Fanko-rawi	20,000,000	tilapia, catfish	Checked, not harvested
	Bademit	33,000,000	tilapia, catfish	Checked, not harvested
	Alghidr	7,800,000	tilapia, catfish	Checked, not harvested
	Megel	683,000	tilapia	Water scarcity
	Adi-maelel	382,000		Not assessed
	Xelim qelay	320,000		Not assessed
Maakel	Beleza	1,200,000	Tilapia, Common carp, Crucian carp, goldfish	
	Mai-Serwa	2,150,000	Tilapia, carp, goldfish	
	Embaderho (No.1)	250,000	Tilapia, carp, goldfish	
	EMbaderho (No.2)	60,000	Tilapia, carp, goldfish	
	Guritat	300,000	Tilapia, Common carp, Crucian carp	
	Shimangus La'lay	400,000	Tilapia, Common carp, Crucian carp	
	Adi-Shaka	5,100,000	Tilapia, Common carp, Crucian carp, goldfish	
	Valinocchi	600,000	Tilapia, Common carp, Crucian carp, goldfish	
	Taereshi	280,000	Tilapia, Common carp, Crucian carp, goldfish	
	Adi-Kuntsi	250,000	Crucian carp	
	Hayelo	1,000,000	Tilapia, Common carp, Crucian carp, goldfish	
	Shimangus Tahtay	400,000	Tilapia, Common carp, Crucian carp, goldfish	
	Mai-Serwa (New)	2,150,000	Tilapia, Common carp, Crucian carp	
	Adi-Beney	90,000	Tilapia, Common carp, Crucian carp	
	Mai-nefhi		Tilapia, Common carp, Crucian carp, goldfish	
	Shaka (Himbirti)	400,000	Tilapia	
	Gomini (Himbirti)	450,000	Tilapia, Common carp, Crucian carp	
	Adi-tsenaf	600,000	Tilapia, Common carp, Crucian carp	
	Diga-Gala		Tilapia, Common carp, Crucian carp	
	Embeyto	130,000	Tilapia, Common carp, Crucian carp	
	Toker	14,000,000	Tilapia, Common carp, Crucian carp, goldfish	
	Tse'azega (big)	453,420	Tilapia, Common carp, Crucian carp, goldfish	
	Tse'azega (small new)	150,000	Tilapia, Common carp, Crucian carp, goldfish	
	Tsaeda Emba	55,000	Tilapia, Common carp, Crucian carp, goldfish	
	Adi-Bidel	90,000	Tilapia, Common carp, Crucian carp	
	Adi-Asfeda	200,000	Tilapia, Common carp, Crucian carp, goldfish	
	Adi-shimagle		Tilapia, Common carp, Crucian carp, goldfish	
	Shindubluk	350,000	Tilapia, Common carp, Crucian carp, goldfish	
	Weki-Duba	25,000	Tilapia, Common carp, Crucian carp, goldfish	
	Mai-Anbesa	350,000	Tilapia, Common carp, Crucian carp	
	Diga-Vacaro		Tilapia, Common carp, Crucian carp	
	Adi-Nifas	600,000	Tilapia, Common carp, Crucian carp	
Debub	Amadr	400,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Gorbaeti	470,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Warsay takita	3100,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Bdho	1,900,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Azayhe	473,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested
	Adilego	30,000,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Mslam	70,000,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Diga Harnet	1,000,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested
	Drko	720,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested
	Zban Sebu	588,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested
	Sememo	2,000,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested
	Adi Bahro	400,000	Tilapia, common carp, Crucian carp, catfish	Nill
	Adi Nfas	700,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Zban Angeb	500,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Gadien Abay	623,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Gura 2	400,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Seled	2,000,000	Tilapia, common carp, Crucian carp, catfish	Unknown
	Sesewe	650,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested
	Una Fero	1,500,000	Tilapia, common carp, Crucian carp, catfish	Checked, harvested

	May Aron	860,000	Tilapia, common carp, Crucian carp, catfish	Unknown
Anseba	Kerkebet		catfish, tilapia, labeo, carp	Checked and been harvested
	Elabered A		catfish, tilapia, carp	Checked and been harvested
	Elabered B		catfish, tilapia, carp	Checked and been harvested
	Elabered C		catfish	Checked and been harvested
	Haleb Mentel		catfish, tilapia, carp	Checked, not harvested
	Musha		catfish, tilapia, carp	Checked, not harvested
	Halhal		catfish, tilapia, carp	Checked, not harvested
	Deku Zeru		tilapia, carp	Unchecked
	Aditekele Zan		tilapia, carp	Unchecked
	Wara		tilapia, carp	Unchecked
	Shieb Seleba		tilapia, carp	Unchecked

Table 2: Production potential of water reservoirs

Reservoir	Yield kg/ha/year	Total area ha	Production (t)
Adi sheka	160	80	12.800
Beleza	30	10	0.300
Embaderho	18	5	0.090
Golagul	21	4	0.084
Shinmangus.L	25	8	0.200
Shinmangus.T	18	5.1	0.092
Himbirty	30	8	0.240
Elabered 1	40	10	0.400
Mai serwa	25	10	0.250
Adi abieto	12	2	0.024
Adi segdo	30	6	0.180
Chefa	35	13.9	0.487
Mai nafhi	360	220	79.200
Gias adi beaghi	32	10	0.320
Hawatsu	12	4.7	0.056
Mai aron	20	30	0.600
Ziban angeb	18	10	0.018
Semomo	60	20	1.200
Mai libus	30	25	0.750
Dirko	35	8.5	0.298
Total	1011	490.2	97.5882
Average per dam	50.6	24.5	4.9
Production potential of 71 stocked dams			341.6
Production potential of all 330 dams			1 610.2

Appendix 16: Fish Production and Market Linkages

Introduction

1. Eritrea's marine fishery sub-sector comprises of cold and dry chain fish production and market linkages which are supplied by industrial trawlers, semi-industrial vessels and small scale fishers. The cold chain fish production and market linkages is well established and handles large pelagic and demersal fish species, including reef dwelling fish, such as groupers, snappers and emperors; demersal fish such as lizardfish and breams; and large pelagics, such as jacks, trevallies, mackerels, tunas and sharks. Other less pronounced fisheries include sea cucumber, snail nail, bonitos, billfishes, red snapper, emperor, king fish, queen fish etc. The dry fish production and market linkages handles mainly the small pelagic fish, particularly sardines and anchovies, but is poorly developed following years of conflict from which it has not fully recovered. The cold chain fish production and market linkages is entirely for human consumption while the bulk of the dry fish production and market linkages ends up in the animal feed industry. Since 2007, small scale sub-sector has accounted for most of Eritrea's annual fishery production, however fish supply has not been consistent, showing a peak in 2009 and yearly fluctuations thereafter.

2. About 3,600 fishers are involved in the demersal and pelagic fishing and are organized into co-operatives, of which 37 have been formed through which they can access training, financial and administrative support and other services. The fish is landed on a number of fish landing sites, eight of them officially designated by the government and provided with enabling infrastructure such as port/jetties, boat construction and repair facilities, ice making plants, cold storage facilities and market outlets. The post-harvest level of the cold chain fish production and market linkages is dominated by the national fishing corporation (NFC). Fishers have to sell fish to NFC or through one of its subsidiaries, who then handles the post-harvest activities, including transportation, distribution, processing and marketing especially in the main urban areas across the country. Private sector fish retailing business have been established in urban areas, who buy fish at wholesale prices from NFC and sell to consumers through smaller strategically located seafood shops and restaurant outlets. However, the dry fish production and market linkages does not have a similar arrangement, with most of the fish currently going to a fishmeal processing plant where it is dried and mostly used for making animal feed. A few retail shops in Asmara sell sardines in small unit plastic packaging.

3. There is no proper institutional setup for post-harvest of dry fish, compounded with limited infrastructure and services for distribution and marketing in the country. A fully functional dry fish production and market linkages should involve the following functions: a) Inputs supply - supply of fishing crafts, nets and other accessories; boat, engine and gear repair etc. b) fish production – fishing of small pelagics in the Red Sea by purse seine and beach seine fishers; c) processing - sun-drying, salting, pickling, powder production and packaging that involve small scale processors at fish landing sites, usually an opportunity for women based enterprises; d) Distribution - Transportation to local, regional and international market through both water and road transportation; e) Marketing - wholesale and retail marketing of the small pelagic fish and fish products in various towns at the wholesale markets, retail outlets and supermarkets; f) Consumption - most of the consumption at the household level, schools and hospitals; the animal feed industry may absorb excess and lower quality fish.

Fish Production

4. Fishing takes place in the Red Sea, with industrial and semi-industrial vessels operating in offshore areas while small scale fishers mainly work in the inshore areas. Industrial fishing trawlers operate mostly in the northern zones (northeast of Dahlak Archipelago, North of Norah Island, and east of Massawa), central zones (bordering near Tio and extending northwards) and southern zones (north of Assab). The mechanized fleet fishing in Eritrean waters consists of about 70 trawlers, of 18-36m in length, most of them foreign fishing vessels of Egyptian, Chinese, Saudi, Spanish and Italian origin, which are licensed to fish within the country's EEZ. The foreign fishing vessels are not in operation every year as the number of licenses administered is reviewed seasonally. Foreign vessels are operated almost entirely by their own foreign skippers although there is usually Eritrean personnel on board to monitor fishing operations and ensure they adhere to the conditions of the licence. There

Eritrean government has also invested in a few fishing trawlers, of 30m in length, and purse seine vessel of under 24m long. All vessels that are involved in the small scale and semi-industrial fisheries are operated by Eritrean nationals. Regulations applying to the industrial fishing include closed areas for trawling, particularly around coral reef islands and to areas shallower than 30m, within 6.5 miles from shore or 4 miles from any island. In addition, all mechanized fishing operations are prohibited from July to September in Eritrean waters.

5. Small scale fishers operate about 793 registered traditional boats and canoes, of which 80% are Houris and 9% Sambuck boat types, while 11% are fibreglass reinforced plastic boats

6. [103.] Houris are wooden boats measuring 4-13m long with an outboard engine and catching on average 16.5 tons of fish per year. Sambouks, on the other hand, are wooden boats measuring 11-18m in length with an inboard engine and catching on average 33 tons of fish per year. The boats have a crew of 6-12 people and normally undertake fishing expeditions lasting 6-12 days per trip. There are also small plank built canoe with flat bottom and vertical sides which are non-motorized and normally paddled by one man. They are generally used for transferring people from shallow water to the anchored Houris or Sambuks and only sparingly used by some fishers for day fishing near the shore. The small scale sector mainly uses hook and line, gillnets or a combination or both; with hook and line mainly used to catch demersal fishes while gillnets are used to catch shark and pelagic fishes. Sambuck fishers predominantly use hook and line while Houris fishers use gillnets and mixed gear. Besides there are over 1000 foot fishers, mainly women and children, who utilise hooks, nets and spears mainly for subsistence fishing.

7. The fishing zones have were mapped[104] for the Eritrean artisanal fishery. By 2011, there were a total of 64 fishing villages recognized, distributed in the Semhar coast (3), Dahlak Island (14), Dankalia coast (26) and Dankalio-Tio border (11). With a total of 1,413 full time fishers.

Fish landing, Processing, Value Addition and Profitability

8. The Government has designated official fish landing sites along the coast where fish is collected by NFC, although subsistence fishers also land fish in other locations. The designated landing sites are; Massawa (Ghibi), Massawa (Erifish), Dahlak, Gelalo, Assab, Tio, Eddi, and Barasole. Other smaller landing sites exist, some which are under construction or being considered for possible development including Wokiro, Marsa Beritae, Marsa Ibrahim, Marsa Gulbub and Marsa Kubba. The cold chain fish production and market linkages is fully supported by the NFC and its subsidiaries Beilul Fishing Company, the Eritrean Marine Products Company (EMPC), the Erifish Processing Plant, the Tio Fish Collecting Plant and the Assab Processing Plant. Erifish plant has the capacity to process 15 tonnes of fish and 4 tonnes of shrimp per day. It has two blast freezing machines and a large cool storage unit which can hold up to 250 tonnes of fish. EMPC has the capacity to process 10 tonnes of fish per day. It has more than 30 employees and several refrigerated delivery vans with different capacities ranging from 4 to 7 tonnes and a large cool storage unit with a capacity of 10–15 tonnes. The main products of this company include fresh fillet (skin-on, skinless or steak fish) and whole fresh fish (whole round or whole gutted). Beilul Fishing Company mainly produces fresh fish products, most of which it sells to the government owned buying firms though smaller amounts are sold to licensed retailers and individual consumers. For the dry fish production and market linkages the only major institutional player is a government entity based in Massawa which produces fishmeal from small pelagics.

9. Based on the catch per trip for 5-9 days for Houri and 6-12 days for Sambuk, the maximum and minimum catches were estimated at between 60 to 140 kg per day and 88 to 160 per day respectively (Table 4). These max-min catch rates were used to estimate the profitability on the basis of cost of fishing per kg of catch for Houri and Sambuk fishing operations at an average of 10 ENK per kg of fish (Table 5). The minimum margin per fishing trip for the Houri was thus ENK 653.00 to 1,176.00 and for Sambuk was ENK 978.00 to 1,955 while the maximum was ENK 1,188.00 to 2,138.00 and ENK 3,632.00 to 7,264,955 respectively.

[103] FAO (2015), ERITREA - Fishery and Aquaculture Country Profiles
[104] Fisheries Development Projects (PDR and Working Papers 2010)

Marketing/Distribution

10. *Domestic marketing:* Fish trade takes place at various stages starting in the fishing ground, at the coastal landing sites, local Zoba settlements, in inland town markets and some for export. At the fishing ground some fishers can sell fish to traders from Yemeni who offer higher prices and in addition provide them with fishing inputs, especially fuel, at cheaper prices than in Eritrea. However, the fishers still sell most of their fish in Eritrea through NFC. The government controls fish price, which is negotiated between NFC, MMR, fishers' representatives and other key stakeholders to ensure the prices remain competitive.

11. NFC distributes fish through its subsidiaries mainly to the main towns across the country. It has specialized refrigerated trucks for transporting fish. In Massawa, Assab, Keren and Asmara the government has constructed public wholesale/retail fish markets, while in other towns consumers buy fish directly from the refrigerated trucks. In Asmara there are seven privately owned retail outlets, comprising of fresh fish shops and sea fish restaurants, with all their fish supply coming from NFC. There is a gradual development in domestic marketing systems with an effort being made by MMR to promote local and external markets and fish consumption by participating in fish shows and other related exhibitions.

12. *Export market:* Export and imports of fish and fishery products is rather limited, with imports estimated at USD 200,000 and exports at USD 7,000 in 2012[105]. The main imports include small and large pelagics such as sardines, anchovies, herrings and tunas; as well as salmon, trout, bonito's lobsters and fresh-water crustaceans. The main export markets for Eritrea include Europe, Egypt and Asia where fish species including snapper, grouper, Spanish mackerel and jack tunas as well as sea cucumbers from the Red Sea are sent. Most of these are fish captured by the licensed foreign fishing vessels as the country presently does not have a fish quality assurance laboratory accredited for fish exports. The recent improvements in infrastructure have increased Eritrea's export potential, particularly to European Union countries. These include upgrading landings and processing facilities, the construction of the Massawa international airport and the redevelopment of Massawa Port. In 2011, it was announced by the head of the Eritrean Free Zone Authority that a new and modern regional port will be constructed in Massawa[106].

Fish consumption

13. Fish consumption in Eritrea is far below other coastal African countries. The per capita fish consumption was estimated at 0.4 Kg in 2011, compared to 9.6 kg for Africa and 18.5 kg for the world average. Overall fish provided 0.2 grams of protein per capita per day in Eritrea, making up 2.5 percent and 0.3 percent of animal feed and total protein respectively. The low fish consumption is attributed to inconsistent supply of fish, leaving most of the population to rely on livestock for their animal protein.

14. There is inadequate awareness about fisheries particularly with inland residents, where most of them are unaware of the species of fish they are eating. The government has responded to promote fish consumption by establishing fish retail outlets in the large towns, which also include seafood restaurants able to provide different recipes. Furthermore the government has been offering subsidies through NFC in terms of ice and fish transport costs in order to keep fish prices low and attract more people from depending only on meat. Some effort has also been devoted in promotion of consumption of small pelagics. These measures have had some success and the demand for fish has been rising. Quite often there will be people queuing to buy fish in the retail outlets when fish is available. The main species that are consumed domestically include Grouper, Spanish mackerel, barracuda, queen fish, jack fish, mullet, shark, tuna, lizard fish, anchovies and sardines.

Service providers for the fish production and market linkages

15. Various services are needed along production-consumption chain involving significant input of finance, capital, technology and skills. This includes fishing inputs, on-board handling, quality control,

[105] FAO (2015) Eritrea Country Profile

[106] Asghedom, R. 2011. Eritrea plans to Construct a New and Modern Regional Port in Massawa. [Online]. Available at: http://tesfanews.wordpress.com/tag/eritrea/page/76/ [Accessed 2013, December 11th].

landing, processing, and storage, marketing of fish and maintenance and repair of fishing vessels; capacity development, quality assurance, research and fisheries management. While the government is a big player in the production and market linkages especially through NFC, it has also made some progress to encourage private sector initiatives to finance activities and enhance experience and knowledge. The government policy for the sector, and supported by the Fisheries Proclamation 104/1998, promotes a co-operative system as a way to organize fishers into viable operational units and enable them access inputs and credit.

Input suppliers

16. Lack of fishing inputs is one of the critical constraints facing small scale fisheries in Eritrea following years of conflicts when many fishing assets were destroyed. The credit institutions in Eritrea are quite weak and fisheries has been one of the most disadvantaged sectors from this shortcoming. The government promotes a co-operative system, consisting of primary co-operatives and co-operative unions, to enable fishers' access inputs and credit. Starting in 1993 with UNDP/UNCDF/FAO programme support, 37 co-operatives have been formed, which are legally recognised and registered by the MMR. IFAD, through FDP, has provided support for building the capacity of the co-operatives. MMR, with support of IFAD, initiated an asset financing mechanism administered by a co-operative credit unit (CCU) through which fishers can acquire the fishing inputs, including boats, nets and accessories. This arrangement so far seems to work well, with MMR providing oversight in terms of identifying potential beneficiaries, approval of financing requests and assisting on repayments from fish that is landed. Most of the fishing inputs, in particular nets and accessories, are imported. Fibreglass boats are imported either from Saudi Arabia or Yemen but some are now made locally in Eritrea. A government owned company, Harena Boat Building, has the capacity to build trawlers, fibre glass boats and 18-meter long liners as per customer specifications.

Training and extension services

17. MMR, through the Marine Resource Development Department has the mandate for developing the technical capacity of production and market linkages actors through various avenues. They include programmed and tailor-made courses at government supported fisheries training institutions and by providing extension services. Hirgigo Fisheries Training College (HFTC) and College of Marine Science and Technology (COMSAT) support development of appropriate fishing technology and train the fishers on modern fishing technology, business plan development and quality assurance.

Fish quality assurance

18. MMR is the competent authority for fish quality assurance in Eritrea. Its Fish Inspection and Quality Control Division provides quality assurance and certification services, however their performance has been constrained by lack of a fish quality laboratory as well as adequate trained personnel on fish technology and quality assurance. MMR is in the process of getting accreditation of its Fish Quality Assurance Laboratory from a South African company which will enable the country to export fish. COMSAT supports MMR in capacity building and training of the small scale processors in Fish Quality Assurance, certification, branding, packaging and business plan development.

Research and fisheries management

19. MMR, through its Marine Resources Regulatory Services Department, is responsible for research in marine resources management, data collection and management, and environmental management. On the other hand the Fish Industry Development Division is responsible for fleet licensing, promotion of investment in the Fishery sector, and monitoring, surveillance and control.

Supply chain constraints

20. There are various bottlenecks affecting the full and proper functioning of marine fisheries production and market linkages. At production level, the country has not fully re-built its national fishing fleet following years of conflict and does not have enough capacity to fully utilize its EEZ. This affects both the large pelagic and demersal fish entering the cold chain fish production and market linkages as well as the dry fish production and market linkages for small pelagic fisheries. For the large fish the government has responded by granting fishing licences to foreign vessels of selected

countries to exploit this fishery. Such attention has not been given to the small scale fisheries sub-sector, thus constraining their participation and productivity in the fishery. The small pelagics small scale fishing operation is currently very limited mainly to a few inshore areas where they use beach seines to catch fish. Small scale fishers lack the proper fishing inputs (boats and purse seines etc.) and the right technical skills to expand their fishing operations to offshore areas which would allow them to also extend the fishing season of small pelagics. As a result there is no consistent fish supply throughout the year. There is also concern with the lack of more recent scientific data and information on the size of harvestable fish stocks for both large and small fish.

21. At post-harvest level, the fishery infrastructure at landing sites is not adequate to accommodate all the landed fish, and in particular electricity is only available on a few landing sites, which limits the capacity to produce enough ice for the cold chain fish production and market linkages. There are no ready spare parts when facilities break down and some of the landing sites presently need infrastructure rehabilitation and upgrading. The processing, distribution and marketing activities in the cold chain are dominated by a single player, the National Fishing Corporation, who has a big hand in market and price decisions. The situation is even more constraining for the dry fish production and market linkages, where there is only one small establishment processing small pelagics for fishmeal and no formal processing and distribution/marketing channel for human consumption. Lack of postharvest processing facilities to preserve catch thus limits the longevity of the product, results in poor fish quality and increases wastage. This is compounded by lack of accredited fish quality laboratory which could enable fish export.

Proposed Interventions to strengthen production and market linkages

22. Most interventions will take place mostly on landing sites along the coast but some activities will extend higher up in the production and market linkages, for instance to the distribution and retail levels. The interventions should aim to the achieve following five outputs; (i) support provided to the cold chain fish production and market linkages in terms of ice-making facility; (ii) fish drying facilities for small pelagic fish established; (iii) innovative fish-based value addition technologies and products developed, and; (iv) umbrella co-operative formed for the purpose of national distribution and marketing small-pelagic fisheries; (v) multi-purpose facility established to facilitate business services delivery

23. ***Enhance ice production capacity:*** Ice is a critical input for the cold chain fish production and market linkages which can leverage production and delivery of increased quantities of high quality fish in the domestic and export markets. While there has been increased production of ice partly through IFAD support, this is inadequate to support the whole cold chain fish production and market linkages. Furthermore ice demand is expected to increase under the new programme to serve an increased number of fishers and also to support longer production and market linkages to other inland towns and possibly to export markets. To address this, there is need to expand the ice production capacity along the coast, ideally targeting landing sites where there is no such facility and where there is a possibility of getting connected to electricity. The ice plant should have a business and sustainability plan to ensure it can be run on sound business principles. The plan should clearly define the ownership/ lease arrangement, and a particular proposal is for MMR to lease the facility to a fishers co-operative after a period of incubation. There will also be need for training personnel for efficient operation of the ice making facility.

24. ***Develop infrastructure for drying small pelagic fish using solar energy:*** The dry fish production and market linkages has been recognized as an opportunity for growth in the marine fish sector. This is supported by the large size of unutilized fish stocks with a Maximum Sustainable Yield estimated at about 50,000 tons per year. The utilization of this resource needs increased investment in solar drying facilities as there is minimal infrastructure at the moment to handle this. Lack of appropriate facilities for fish drying can result in high post-harvest losses, including physical losses when spoilt fish is discarded, quality losses therefore fish is used for unintended lower-end purposes and reduction in value so consumers pay less than normal prices. The need for improved drying facilities is therefore vital to support the expected increase in production of small pelagic fisheries. This will include solar fish drying facilities established at selected landing sites to handle increased volumes of small-pelagic fish. In addition there is also a need for smaller mobile fish drying facilities

that fishers can set up on particular sites temporarily for relatively short durations and shift with them to other fishing areas along the coast.

25. There are various design options for solar powered fish dryers but the facility should bear the following features; (i) simple design that keeps the cost of installation low, and where most of the material can be easily sourced locally and can be constructed by local labour; (ii) consider social factors such as attitudes, lifestyle and behaviour of the fishers and fish processors who are the users; (iii) Low maintenance cost and local capacity to carry out such services; (iv) Achieves faster drying compared to the conventional drying methods, saves space and is appropriately covered to avoid product contamination and predation (v) be of adequate scale to accommodate large volumes of fish, possibly expandable in case of unusual high fish catches (vi) Should not destroy product flavour and other desirable properties. To maximise the benefits from the investments, other services should be upgraded for hygienic fish processing, including access to piped water and sanitary facilities at the targeted landing sites and proper fencing of the facilities to keep off predators; storage and transport facilities; improved hygienic conditions of fishing boats, better product handling and improved packaging. The facilities should have a business plan for their operations and sustainability.

26. ***Develop processing/ value addition technologies and fish products:*** The small pelagic fisheries presents opportunities of introducing new techniques and preparation of innovative products and recipes. Such innovations need to be piloted to ensure the viability of the production processes, assess the market potential and economic viability of the products. Some of the techniques and fish products to be piloted include; solar-dried assortments, pickling, fish powder, protein concentrates, salted-pressed, cooked-sundried, fish snacks, fermented products, fish oil, fish sauces and different fish recipes etc. The successful products can then be introduced to fish processing and marketing enterprise groups for commercial uptake. There will also be need to strengthen the national capacity to develop regulations and standards for food quality and safety with respect to fishery products and support branding and promotion of viable fishery products into the local markets. Additional support for operationalization of the food quality laboratory is vital for Eritrean fisheries to access export markets.

27. ***Establish umbrella co-operative for distribution and national marketing of small-pelagic fishery:*** A major limitation in the dry fish production and market linkages is the lack of an institutional set up for distribution and marketing of the small pelagic fisheries in the country. The private sector may not be well equipped and have the skills to fill this gap in the short term. A potential solution is to form an umbrella co-operative whose primary membership will be individual fish processing co-operatives and enterprise groups. The co-operative should be formed in line with the Government of Eritrea's procedures and regulations for establishment of such institutions, in this case MMR will facilitate the process including mobilization of members and capacity building. The main function of the co-operative will be nationwide transportation, distribution and marketing of small pelagic fisheries products. In this way the co-operative serves a very important function of linking fish producers (fishers and fish processors) with consumer markets.

28. ***A feasible financing mechanism should be worked out to support initial capitalization and operational expenses of the co-operative:*** This financing should enable the co-operative to acquire the necessary assets including trucks and fish transport boats, both facilities well equipped to transport dried fisheries products. A business plan should be developed for its operations and capacity building to enhance the entrepreneurial skills of the staff. ***Multi-purpose business services facility at landing sites:*** The fish landing sites do not have adequate facilities to accommodate all the services needed for dry production and market linkages services. The need for a multi-purpose facility for consolidation of fisheries operations and services can be very useful in terms of ease of service delivery, exchange of information and complementation of activities by different service providers. Such facility can comprise of; net making/ repair workshop, boat engine repair workshop, fishing inputs store, and office for extension agents. Each facility should be developed with a clear business plan detailing the ownership/lease arrangements and means of financing, possibly in form of rent payments by the business units operating within.

Appendix 17: Nutrition

1. **Background –** The economic and poverty situation in Eritrea has been worsened by periodic droughts and the country's dependence on rain fed agriculture makes it highly vulnerable to food and nutrition insecurity. The poverty is most severe in the coastal plains, home to a strong fisheries sector. Fisheries sector contributes about 3% of the country's GDP and has the potential to substantially increase with development of artisanal sector and aquaculture. Fisheries is one of the two key pillars of IFAD comparative advantage (Agriculture and fisheries) in Eritrea. The purpose of FReMP is to upscale successful interventions and expand on the Fisheries Development Project (FDP) with an added focus on the small pelagic fish. The Government of Eritrea (GoE) has set out specific policies for the development of the fisheries sector. The strategic objectives and priorities for the fisheries sector include improvement of the livelihoods and food security of artisanal fishers. The rich fisheries resources in the country have the potential to considerably contribute to the food and nutrition gaps in coastal and inland communities.

2. **Food and Nutrition Strategies –** Food and nutrition security is one of the priorities and cornerstones for sustainable growth and poverty eradication in Eritrea. Several strategies, including the national plans and strategies on nutrition have been developed in the State of Eritrea to address the high rate and prevalence of malnutrition. Eritrea's food security strategy (FSS) contains two inter-related sub-strategies: a) National food Security Strategy; and, b) Household Food Security Strategy. The goal of the FSS is to ensure that all Eritreans have sufficient nutritious food at all times so that they would be able to lead healthy and productive lives. Household food and nutrition security strategy involves enhancing productive capacity of small scale farmers and enhancing household's purchasing power. The national food security strategies are pertinent to fisheries sector with the aim of developing and promoting both industrial and artisanal fisheries. The strategies pursued by the Ministry of Marine Resources (MMR) to develop and manage the fisheries sector in Eritrea involve enhancement of community-based fisheries production and development of fisheries infrastructure in key fishery centres to handle higher volumes and improve quality of production.

3. In an effort to intensify activities on nutrition, the Government of Eritrea formed a Steering Committee on National Food and Nutrition Security to improve nutritional status of the vulnerable groups. A technical sub-committee was initiated to accelerate the implementation and activities on nutrition. Membership of the technical committee comprise of the four line ministries; Agriculture, Health, Marine Resources, Trade and Industry. Some of the UN agencies are also members of the technical committee. Mainstreaming nutrition in FReMP is focused on influencing the two sub-strategies of Eritrea's FSS – National Food Security Strategy and Household Food Security Strategy.

4. **Nutrition situation –** According to Eritrea's Demographic Population Survey (EPHS, 2010), malnutrition situation among the under five-year old children portrayed severe burden of stunting (50.3%); underweight (38.8%); wasting (15.3%). Also the Global Nutrition Report (2015) showed 32.8% prevalence of anaemia and stressed that meeting target of nutrition status in Eritrea was off course and at risk. In similar vein, the World Food Programme (WFP), UNICEF and the Government of Eritrea Joint Food Security and Nutrition Assessment (2015) noted that El Nino may exacerbate the already worrisome food security and nutrition situation.

5. The underlying causes of poor nutrition include in addition to food insecurity, poor hygiene and sanitation, inadequate care e.g. early pregnancies, infant and young child feeding practices, maternal nutrition, and workload for women. Women play a vital role in a child's nutrition and maternal nutrition is crucial for mother's and child's health and has a clear relationship with child's level of stunting. Most of the household heads are female in Zobas Debub (56.8%) and Maekel (52.6%) and about half of the women of reproductive age (15-49 years) are undernourished (BMI <18.5). Undernourishment during pregnancy has consequences on foetal growth and development, morbidity and mortality of both, mother and child.

6. **Fish consumption and Food Practices –** The six administrative regions/Zobas in Eritrea (Anseba, Debub, Maekel, Gash-Barka, Northern Red Sea and Southern Red Sea) have a number of ethnic groups and different cultural practices. These six Zobas fall within three geographic zones: the western lowlands, coastal plains (known as eastern lowlands) and the high lands (central and northern part of the country). The main source of livelihoods in the three geographic Zones are subsistence agriculture, fishing, and pastoralism. The key traditional food in Eritrean cuisine is

tsebhi (stew), served with Njera/taita (flatbread made from teff, wheat, or sorghum), and hilbet (paste made from legumes; mainly lentil and faba beans). Annual per capita fish consumption in Eritrea is very low (0.4 kg) compared to average consumption in Africa and the world (9.6 kg and 18.5 kg, respectively). This low consumption of fish, especially in the rural communities, is associated with inconsistent supply, poor demand and traditional preference for meat, regardless of its higher market price.

7. A survey conducted on fish consumption in Asmara reported that 21% of respondents never use fish in their diet and had preference for meat regardless of its higher market price (Teweldemedhin, 2006). However, this survey found that inclusion of fish in the restaurant menus at urban areas was a well-established tradition. About half of the restaurant served fish every day, and the rest for at least three times in a week. This finding is consistent with the EPHS report that revealed higher consumption of iron-rich foods in urban areas (48 percent) than in rural areas (26 percent). Children in Maekel are the most likely to consume iron-rich foods (50 percent), while those living in Anseba are the least likely (23 percent). It was also noted that the demand for fish was related to religion. High demand and consumption of fish was linked to the traditional fast (non-meat) days of the Orthodox Church (Wednesdays and Fridays).

8. Fish is a very rich source of quality protein, and contains a variety of vitamins and minerals, including Vitamin A and B12; minerals, including calcium, zinc, iron, iodine, selenium, phosphorus and potassium,and essential fatty acids-omega[107].Vitamin A is an essential micronutrient for the immune system. Deficiency of vitamin A can lead to eye damage, increase the severity of infections, child morbidity and mortality. Food sources of vitamin A include fish, milk, liver, eggs, butter, red palm oil, mangoes, papayas, carrots, pumpkins, and dark green leafy vegetables. The findings of vitamin A rich food consumption (83 percent) in zoba Maekel could be attributed to high fish consumption in the area (EPHS, 2010). Fish is a good vehicle in bridging the micronutrient deficiencies affecting particularly women and children in poor rural population. There is a dearth of data on food practices, attitudes, constraints and opportunities in the different communities which should influence selection of appropriate interventions and monitoring of progress.

9. **Nutrition Mainstreaming –** Integration of nutrition objectives in FReMP is in line with the Government strategy on food security and nutrition via fisheries and particularly the small pelagic fish production and market linkage development. Small pelagic fish has not been given prominence as a vehicle for improved nutrition despite its richness in quality protein, essential vitamins and minerals. This resource is often used for livestock feed with little attention on human consumption. Given the state of malnutrition in Eritrea, the Government and development partners have initiated efforts to accelerate food security and nutrition, including investigation on the potential of small pelagic fish.

10. In this vein, FReMP interventions on small pelagic fish will be oriented to local consumption, availability and access to quality fish in the domestic markets with special attention to women, vulnerable and nutritionally at risk groups. Specific nutrition actions will include promotion of fish consumption and nutrition education, improved fish processing, products and recipes development, nexus of gender and climate mainstreaming and evidence-base knowledge on nutrition outcomes. The nutrition operationalization in FReMP implementation aims to contribute to the food system approach in the national nutrition strategy revision and policy engagement on global, regional initiatives on food and nutrition security.

11. **Nutrition-Sensitive Fisheries System (Small Pelagic Production and market linkage) –** The small pelagic production and market linkage will adopt various pathways for good nutrition: consumption, availability and access to quality fish in the domestic markets.

- ***Consumption Pathway –*** This approach will focus on the fisher folks as producers and consumers of fish. The baseline food survey will generate information on the prevailing knowledge, socio-cultural practices and challenges of production, safe postharvest handling practices, household consumption patterns, preparation methods. Intervention on this pathway entails improving dietary intake at household level and at institutions. Promotion and nutrition education will facilitate adequate utilization of income rise for dietary diversity and improved family diet;

[107] The data are reported in a Worldfish (2015) Report: Aquaculture and Fisheries for Nutrition.

- ***Market Pathway –*** This approach aims at influencing the food environment, resulting in an improved access to and awareness of nutritious and diverse foods in the market, increased market availability, and reduced prices. Intervention on this pathway will support income generation through value added products, linking fishing enterprise groups to market outlets for availability and access to nutritious food;
- ***Nutrient Profile Pathway –*** This approach will focus on fishing enterprise groups who will receive training on processing technologies. The purpose of this activity will be to optimize nutritional value and food safety along the fish supply chain – production, processing, and preparation of fish, recipe and fish-based products. The interventions entail quality fish production, improved processing, storage, development of recipe and product.

12. **Promotion of Fish Consumption –** This activity will target the traditionally non-fish eating communities, non-fishing communities, households at the dam catchment areas, women and children. Traditionally, communities that are far away from the sea are not familiar with fishing activities and tend to have poor fish eating habits. Fish consumption will be promoted through the existing multi-sectoral approach for community based interventions. MMR staff at Zoba and sub-Zoba levels will collaborate with the Ministry of Health (nutrition community volunteers), Ministry of Agriculture (extension workers, home economic experts and home agents), the National Union of Eritrea Women associations and National Union of Eritrean Youth and Students. In an effort to leverage resources and build synergies in addressing the underlying causes of malnutrition, this activity will explore partnership with other development partners (FAO, UNICEF) on nutrition/health messaging, water, sanitation and hygiene (WASH) and behaviour change communication. GoE recognizes communication as a comprehensive action with broad stakeholder participation and multiple channel of information dissemination. Promotion activities will be implemented through three stages: a) awareness campaign; b) development and promotion of recipes; and c) sustainable dietary intake.

- **Awareness Campaign –** This activity will aim at sensitization, behaviour change communication to create awareness, educate and inform on the important nutritional quality of fish with emphasis on the small pelagic fish consumption. The channels for promotion will explore radio/TV programmes, drama, social marketing, newsletter, magazines, songs in local languages and the gender tool on household methodologies;

- **Nutrition Education Modules** will be integrated in the training plans of the Hirgigo Fisheries Training Centre and Inland fisheries Research Centre in Mai-Serwa. The nutrition education content will include: a) sensitization on nutrition-sensitive fisheries and agriculture, b) basic nutrition knowledge on fish and other staple foods; c) ability to promote nutritious food and adequate consumption pattern in both coastal and inland areas; d) skills in behaviour change communication. These two training Centres will strengthen the capacity of extension workers and other implementers in conveying nutrition messages.

- **Recipe Development –** Existing recipes, including different traditional dishes, will be reviewed and updated with enriched fish based recipes. The available recipe booklet was produced in 1997. New improved recipes will be developed by enriching locally available staples with fish. The purpose of this activity is to increase dietary diversity and availability of varied nutritious products. The Programme will provide support for the recipe development and nutrition analysis of value added products. In collaboration with FAO, Ministry of Health, MOA's Home Economics Unit and Nutrition, the existing recipe book will be updated and households will be trained on new developed recipes. The recipes will be published in forms of leaflets and booklets with translation in different local languages. Food demonstration using the new recipes will be conducted by extension workers at community levels.

- **Sustainable Dietary Intake –** This activity aims at influencing regular availability of fish for sustainable food security. At household level, the activities on fish promotion, behaviour change communication and nutrition education will be implemented using the household methodology approach. This approach will explore gender issues to accelerate uptake of nutrition information and improve food practices for sustainable adequate family diet. The household methodology will engage entire household members – males, females, children, adults and the elderly to ensure common understanding of the nutrition message/education and compliance for adequate dietary intake. The household methodology tool will build on the existing model for campaigning and

awareness creation adopted by the Home Economics Unit of the Agriculture Extension Department. With support from the Home Economics Experts, the home agents and extension workers at the grassroots will reach out to the households through the early innovators. These early innovators could be male or female leaders in the communities.

13. **Processing and Value Addition** – FReMP will support pilots of different processing and value addition technologies, such as solar drying, improved sun-drying techniques, pickling, salted-pressed, cooked-sundried, etc. Nutrition analysis will be carried out on the selected techniques to determine the nutritive value and safety of products. Through participatory approach, fishers groups and enterprises will be supported on promotion of the appropriate technologies in addressing seasonality, post-harvest handling and diet enrichment. Capacity of fishing enterprise groups will be strengthened for uptake of viable fish processing and value addition technologies. Support linkages will be made for market outlets. Value added products, such as fish oil, fish powder, protein concentrates, fish-based snacks, fish sauces, etc. will be produced for the market by the trained fishing enterprise groups/cooperatives. The value added products will be promoted for consumption at households, in hospitals for malnourished children and schools. In the first two years of implementation, FReMP will support increase access/availability of fish products in institutions to promote fish consumption and improve dietary intake. Potential partnerships with the Ministry of Health and UNICEF will be explored for outreach extension to vulnerable groups and infant and young child feeding. The drivers for successful technology uptake and increased outreach is the acceptance from the fisher folks and communities. Following below are the different advantages associated with the value-added products:

- Pickle/fermented fish products will ease the problems of storage and shelf life;
- Fish powder, protein concentrates, fish oil will enhance nutritive value of starch staples, such as Njera dish, kicha (local bread);
- Fish-based snacks increase variety of nutritious ready to eat foods.

14. **Policy Engagement** – The development and promotion of improved quality and quantity of fish is pertinent to MMR responsibilities towards the National Food and Nutrition Security strategies. MMR is a member of the food and nutrition technical committee, tasked with the responsibility of accelerating actions for good nutritional status among the vulnerable groups. The scope of work for this technical committee included production of dry fish powder in Massawa for malnourished children. An experimental product has been prepared (powder fishmeal) in COMSAT. The analysis has confirmed its suitability for human consumption and 0.3 tonnes was procured for malnourished children in Orotta Referral hospital. FReMP will empower a nutrition focal person in MMR for active representation in the technical committee. The nutrition focal person will be responsible to facilitate FReMP collaboration with stakeholders, including the UN agencies, other ministries (Ministries of Health, Agriculture, Trade and Industry) and collate information/data on nutrition outcomes in the various nutrition activities. The interventions on processing technologies for availability and access to value added fish products is an entry point to influence the national policy on Food and Nutrition Security. Implementation of FReMP aims at contributing to food system approach in the national nutrition strategy and policy engagement on global, regional initiatives on food and nutrition security (e.g. SUN, REACH, CAADP/NEPAD, and COMESA). Mainstreaming nutrition in FReMP aligns with IFAD's corporate commitment to nutrition-sensitive agriculture/fisheries. The various pathways identified for nutrition outcomes in the small pelagic fish system is linked to the operationalization of the IFAD action plans on nutrition mainstreaming.

15. **Food survey and Knowledge management** – There is a dearth of data on prevailing nutrition situation, fish consumption and food practices in the various communities at coastal and inland areas. The Programme will support the undertaking of baseline food survey for an evidence-based contribution to nutrition outcomes. This survey will provide the space to reaching out to IFAD target groups on peculiar hindrances for adequate dietary intake and fish consumption. Traditionally, some communities do not eat fish and in some cases there are taboos that restrict feeding fish to young children. The baseline food survey will be conducted to ascertain information on prevailing nutrition Knowledge, food Attitudes and Practices (KAP), to guide nutrition education, nutrition-sensitive interventions and benchmark data for tracking progress on nutrition outcomes. Information areas will include: a) fish consumption pattern and practices; b) food availability, access, preference and dietary patterns; and c) socio-cultural factors, food myth and taboos.

16. The survey findings will generate information to complement the national data on fish consumption patterns in Eritrea. Good practices and lessons learned will be disseminated through factsheets, technical reports, publications, meetings and workshops with stakeholders. Knowledge sharing platform will be developed at national and regional/Zoba levels.**Nutrition Nexus with Gender and Climate Mainstreaming/Natural Resources Management** – The activities on fish promotion, behaviour change communication and nutrition education will be implemented at household level using the household methodologies approach. This approach will explore gender issues to accelerate uptake of nutrition information and good food practices for improvement in family diet.

17. In the effort of promoting fish production in targeted reservoirs, the Programme underpins management of natural resources and environment protection within the reservoir catchment areas. The protection and management of catchment areas involves activities with prospective benefits to nutrition outcomes. For instance in the coastal areas, mangrove plantation boosts bee breeding for honey, increases availability of crabs and increases fodder for livestock. In the inland areas, plantation of fruit trees, legumes and vegetable gardens increases availability and access to food diversity. Introduction of improved cooking stoves is a measure to enhance the sustainability of land management, reduction in use of fuel wood. Improved cooking stoves have significant labour and time saving impact in women's workload and diet preparation. A pilot research area will be explored to generate knowledge and evidence on the integrated approach between fish promotion and nutrition benefits from environmental and natural resources management. Once articulated, the lessons learned will be disseminated and good practices scaled up.