BAGAMOYO DISTRICT COUNCIL

Decentralized Minor Permitting Procedure for Small Scale Mariculture activities for Bagamoyo District

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USAID FROM THE AMERICAN PEOPLE

COASTAL RESOURCES CENTER
University of Rhode Island

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Cover Photo: Fish pond

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PART I

1.1. EXECUTIVE SUMMARY

The coast is the place where the land meets the Ocean. It is an area that is endowed with abundant and unique resources that need to be protected and conserved in a sustainable manner.

The National Integrated Coastal Management strategy provides a framework under the National Environment Policy that links sectors at the District level and leads those sectors in a cooperative way in order to bring sustainable development. Coastal resources are under huge pressure that is caused by people being highly dependent on them for food and other basic needs, thus increasing the likely failure of these resources to support our future generations. Recently, different large economic activities are being located in coastal areas and more will follow. The establishment of a zoning and management plan for small-scale pond mariculture in Bagamoyo district addresses one of the economic activities that are to provide development in our coastal communities.

Mariculture activities started in Bagamoyo district before 2004 when farming was done in salt pans and reservoirs used to keep water for salt crystallization. In 2004 demonstration ponds for fish farming were constructed at Mapinga village. This generated interest by a quite large number of people for engaging in mariculture activities.

It is for this reason that Bagamoyo district has decided to use an Integrated Coastal Management (ICM) strategy to introduce a zoning system that will establish permitting procedures for estuary and mangrove areas for pond mariculture. This system addresses the expanding number of requests for milkfish pond developments and will ensure that there is no significant environmental impacts from individual farms as well as potential cumulative impacts due to increase in number of ponds to particular area. Bagamoyo is creating a model ordinance relevant to other areas of the nation and is a way to scale up responsible milkfish farming in the vicinity of existing pond sites.

The District authorities will now regulate eligible projects for minor permits, set limits on the location, size of small scale mariculture operations and determine suitable species for cultivation. Establishment of new ponds and normalizing existing pond aims to encourage well running pond operations that produce the intended products which are highly resistant to damage and disease. The ponds in Bagamoyo will not cause problems to others. The new procedures remove any uncertainties in decision making, which benefits the district as well as the permit holders in the three wards where fish pond development will be permitted.

The planning and design of this document involved a range of stakeholders from village to district levels. The process involved village government leaders, fishers, mariculture farmers, salt producers and district experts in fields of natural resources and allied industries.

The steps followed to prepare this document included identification and mapping of potential sites for mariculture activities along the coastline of Bagamoyo District. The field survey involved seed scouting and setting of criteria for the best mariculture practices

Furthermore, this document contains guidelines for mariculture practices in Bagamoyo district that form an important part of a master plan for the coast that will reduce conflicts in potential mariculture areas for the benefit of all coastal communities. It is anticipated that enhanced mariculture practices will contribute to economic growth of communities and hence play part in poverty reduction as stipulated in MKUKUTA, MILLENIUM 2015, Dira ya Taifa ya Maendeleo 2025 and Kilimo Kwanza Policy.

In conclusion, I would like to offer my gratitude to the United States Agency for International Development (USAID), the Coastal Resources Centre of the University of Rhode Island (CRC/URI), the Tanzania Coastal Management Partnership (TCMP), and Government officials of Bagamoyo District Council. I also would like to thank all the Bagamoyo stakeholders who participated and contributed to the development of this document and who generously supported the process.

Bagamoyo District Executive Director

1.2. ENDORSEMENT FROM BAGAMOYO DISTRICT

This Decentralized Minor Permitting Procedure for Small Scale Mariculture activities for Bagamoyo District have been reviewed and found to be a substantive and useful contribution to the mariculture project review process. We will therefore use the criteria and the outlined procedure for the provision of permits to small scale mariculture proposals in our coastal villages.

SIGNATORIES

CHAIRPERSON BAGAMOYO DISTRICT COUNCIL

BAGAMOYO DISTRICT EXECUTIVE DIRECTOR

1.3. ABBREVIATIONS

CMT	Council Technical Team
DED	District Executive Director
DTT	District Technical Team
EIA	Environmental Impact Assessment
GPS	Global Positioning System
ICMWG	Integrated Coastal Management Working Group
NEMC	National Environmental Management Council
TCMP	Tanzania Coastal Management Partnership
TIB	Tanzania Investment Bank
TIC	Tanzania Investment Centre
USAID	United States Agency for International Development
WDC	Ward Development Committee
VG	Village Government

1.4. DEFINITION OF TERMS

The following terms have a specific meaning within the context of these Guidelines:

Application fee –a fee that is required to be paid during the application for a mariculture site in a district

As-built or existing pond – an earthen pond already constructed to create an enclosure for culturing of fin fish or any marine organism

Council Management Team (CMT) - refers Councils' Head of Departments of the Bagamoyo District Council.

Council Technical Team (CTT) – refers to council heads of sections in the district representing their expertise, e.g. natural resource, fisheries, forestry, etc. during the evaluation of applications for aquaculture ponds.

Cultivation Method – The method applied to culture any aquatic organism.

Enforcement action – Any action aimed to curb illegal practice, e.g. construction of a pond in mangrove areas

Estuary – the aquatic region where marine and fresh water meet (river mouth meets with ocean) mostly the area is rich in prawn fishing

Existing pond – A pond that are already built and stocked with fingerlings

Exotic Species – Non-native species that are imported or introduced from outside the area in question

Extensive Cultivation – Cultivation of aquatic organism whereby the organisms totally depend on natural habitat for food, i.e. no manure, no fertilizer, no external feeding etc.

Global Positioning System (GPS) A technique involving a hand-held electronic device that records the geographic position of the user which should be used to locate, record and map mariculture ponds and related infrastructure for the spatial data base.

Intensive Cultivation – Cultivation of aquatic organism where they totally depend on man-made feed and husbandry

Large scale aquaculture – means a system having a water surface area of five hectares or more for breeding or raising fish

Major Permit – Permit that involves large scale (greater than 10 ha) mariculture operations and has to go to NEMC for EIA.

Mangrove Zone IV – The zone that is permitted for development of various activities according to the Mangrove Management Plan, e.g. construction of fish ponds or salt pans, etc.

Mariculture operation – Is the keeping or culture of aquatic organism, e.g. in ponds, cages, etc.

Minor Permit – The permit involves small scale (less than 10 ha) mariculture operation which does not need to go NEMC for EIA.

Native species - Species that found naturally in the area of concern.

One Stop Review – Is the review of a mariculture project whereby everything is done in one multi-sectoral office: application, review and permitting.

Operation fee – A fee that is charged on a periodic basis during the operational lifetime of a licensed pond.

Permit Application – Request for permission to undertake a mariculture operation in a potential site through completing a written form with pertinent information about the proposed project that is sufficiently complete to allow authorities to review and evaluate it.

Permit Approval – The written decision containing approval or permission for the requested application

Permit Monitoring Data Base: the data file that contains all data collected about aquaculture project including application for permission, decisions, enforcement and environmental monitoring for each application.

Permit Rejection – Termination of permit/permit refusal.

Permit Renewal – This is the application for a permit at the end of the previous permit.

Pond – Small body of standing water used for the culture of aquatic organism.

Salt Flats – A base area inundated by seawater often used for salt pans.

Semi intensive aquaculture – means the practice whereby fish are kept under confinement and biological, physical and chemical parameters are partially controlled

Semi-Intensive Cultivation – Cultivation of aquatic organism where the feeding process partially depends on natural habitat and the other part might be introduced or man-made feeds or nutrients.

Significant environmental impact: a substantial, or potentially substantial, adverse change in any of the conditions within the area affected by the project, including but not limited to land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Site – Location/place chosen for pond construction.

Site inspection – A physical inspection of the proposed or built pond site by one or more members of the District Technical Team for verification for the accuracy of information in the permit application and to check for suitability of the area where culture of marine organism is expected to take place.

Small-scale aquaculture-means the practice of breeding or raising of aquatic organisms within an area not exceeding one hectare

Spatial Data- Base – Data base that contains information about the location, extent and nature of culture.

Stocking species – species that are stocked in a pond to grow.

Use or Access Rights - specific permission given to the applicant for a license to utilize the land area for the duration of the aquaculture project, in the form of a lease, title, grant, permit, concession or other legally binding document that protects the holder from loss of access for a prescribed period of time.

Village Development Committee – A Village committee comprising members from that particular village responsible for addressing development issues of the village

Zoning Scheme – separation of certain zones to reduce user conflicts depicted by a written or visual representation of boundaries, allowable uses and restrictions.

1.5. INTRODUCTION

Mariculture in Tanzania is in an early stage, but is steady growing. The number of fish ponds (milk fish, mullet, tilapia, and prawn) in coastal districts approaches 100. With some 50,000 hectares of salt flats in the country, the potential for fish and prawn farming expansion is high and growth is likely to continue, contributing to food security, income generation and employment in coastal communities.

The development of pond mariculture in Tanzania faces a number of challenges which include uncertain legal ownership for sites responsible for aquaculture, the need for reliable source of quality seeds, the limited number of qualified extension officers, high initial investment cost and fish feeds. There is high potential for developing mariculture practices so that coastal communities may benefit economically, however not every individual will have enough capital to build the infrastructure for the larger, more difficult sites. With increasing decline of capture fisheries, the need for testing the viability of small scale, less capital-intensive mariculture in suitable locations to help meet protein requirements through fish and shellfish farming remains paramount. In this regard Bagamoyo district finds it worth to improve small scale mariculture practices by zoning of potential sites and issuing permits for areas currently practising mariculture along its coastline.

The need for mariculture monitoring and control in Bagamoyo is not a new idea. It can be traced back to the early 1990s when the Bagamoyo Mariculture Working Group suggested various priority areas required to be improved to enhance mariculture in the district among which was setting of criteria for pond culture and approvals. Subsequently, much of similar ideas have been taken on board to develop mariculture permitting guidelines included in this document termed as Bagamoyo District Small-Scale Mariculture Zoning and minor Permitting Procedure. The goal of the Bagamoyo District Small-Scale Mariculture Zoning and minor Permitting Procedure is to carry out a functional, practical, coordinated and decentralized permitting system in Bagamoyo District for small-scale coastal mariculture projects (particularly for milkfish, mullet, tilapia and prawn farming and any other form of raising marine species in captivity). This is an attempt to establish good Integrated Coastal Management (ICM) practice that utilizes spatial information for decision making.

Most small-scale mariculture activities can be broadly divided into three types:

- Earthen pond culture
- Open water culture systems operated in the intertidal and sub intertidal waters (mollusc culture in shallow salt water areas, seaweed farming in coastal seas, pen and cage culture in sea water bodies, and culture of giant clams, sponges and corals in or near coral reefs)
- Hatcheries for finfish and shellfish including prawns and crabs

The Bagamoyo District mariculture zoning and permitting procedures document is aimed at providing a way to monitor and control all activities related to rearing marine species along the coastline of Bagamoyo. Such activities includes but not limited to seaweed, pearl oyster, milk fish and prawn farming, crab fattening and production of related fingerlings.

Theoretically, mariculture practices can be conducted on agricultural land, salt flats and undesirable land. These habitats are typically part of marine ecosystem and normally under village, ward district or private ownership. Hence on implementation of this document a fish

farmer will be required to obtain permit from the Mangrove reserve Authority or place to be used for mariculture from respective sector. Where applicable, developer will need to obtain license from District Fisheries officer, if it is a big project NEMC and Aquaculture Division should be involved in EIA and Licence giving respectively.

The experience shows in some cases mariculture operators could potentially use a particular habitat site in ways that are not prohibited legally, but which could still cause negative impacts to the neighbouring environments. Zoning as a management tool used in conjunction with a simplified and decentralized permitting system can help avoid this dilemma and regulate use in areas appropriate for mariculture.

These procedures aimed to develop a zoning and management plan for small-scale mariculture in Bagamoyo district that can be used for sustainable development of mariculture as a pilot for other districts in Tanzania. It also aimed to provide a practical permitting procedure for interested small scale mariculture investors in Bagamoyo district. This will provide sustainable mariculture development and management with low environmental impacts.

1.6. OBJECTIVES

1.6.1 Main objectives

The objectives of the Bagamoyo District Small-Scale Mariculture Zoning and its Minor Permitting Procedure are to put a mechanism in place which would provide smooth monitoring and control of mariculture practices in Bagamoyo District. This objective aimed to locate potential sites for mariculture activities to ease the provision of permits for sustainable small scale mariculture activities for improving livelihoods of the coastal communities. It is anticipated that through this process the district will be able to:

- Characterize and map potential mariculture areas in Bagamoyo District so as to provide orderly development
- Establish a low cost, efficient, decentralized permitting procedure for small-scale pond mariculture, reducing the potential for cumulative impacts and providing a model for other coastal Districts
- Promote responsible, controlled growth of small-scale earthen pond culture in a way that is environmentally sustainable and does not exceed the carrying capacity of the estuaries or degrade mangrove ecosystems
- Document and monitor mariculture operations to enable enforcement of compliance with policies and to provide information to allow for adjusting policies in the future
- Advance environmentally and economically sound land use planning in relation to resource allocation and population in coastal communities

1.6.2 Specific Objective

This document is specifically aimed to address key issues as related to mariculture development which includes:

- Establish an efficient, low cost and decentralized permitting procedure for sustainable small scale mariculture systems

- Reducing the potential for cumulative impacts resulting from exceeded carrying capacity of fish ponds in the estuaries or degrade the mangrove ecosystems through the enforcement of compliance with polices and to provide information to allow for adjusting polices in the future.

- Create a mechanism through which all mariculture systems in the district are registered and monitored

1.7. Bagamoyo District Mariculture Policy and Strategies

The Bagamoyo mariculture policy aims at ensuring that practices and development of the industry is in sustainable manner in terms of environment conservation and contribution to socio-economic of the communities involved. The policy states that, *"Mariculture practices are sustainably carried out in terms of environment and contribution to socio-economic and improve livelihood of coastal communities in Bagamoyo district"*.

This policy is based on the following strategies:

1.7.1 Strategy 1. Create monitoring and control mechanism for mariculture practices at district level.

(a) Allowable methods of cultivation

The District will only issue permits for extensive and semi-intensive forms of cultivation. Proposals for intensive culture of species will be rejected outright and applicants directed to the attention of the National Environmental Management Council, Aquaculture Division or TIC.

(b) Eligible projects for Minor Permits issued by the District

The following existing ponds and newly constructed ponds are generally eligible for a Minor Permit if they meet the following requirements:

- Involve a total of less than 10 hectares
- Do not utilize exotic species
- Do not involve intensive forms of cultivation technology
- Have clear title or tenancy over the site
- Are acceptable to the village and ward where it is located
- Will not cause significant environmental impacts
- Are located in designated suitable areas

(c) Limits on the location of small scale operations

It is the policy of Bagamoyo District to limit the areas where small scale mariculture can occur to those locations which are behind mangrove forest, corresponding to areas designated as suitable in technical studies and encompassing portions of agricultural land, salt flats, undesirable land and areas designated as Mangrove Zone IV.

Bagamoyo District has an estimated area of 1949 ha where mariculture activities might be permissible. Based on field analysis these salt flats are distributed in the four coastal wards, namely Mkange, Magomeni, Dunda and Zinga.

(d) Limit on the size of mariculture operations

It is the policy of Bagamoyo District to limit the size of a small scale pond mariculture individual operation to no more than 1.2 hectares. Proposals larger than this will be rejected outright and the applicant directed to apply for a Major Permit from the National Environmental Management Board or Tanzania Investment Bank (TIB) and Aquaculture Division.

(e) Species suitable for cultivation

The District will only issue permits for the cultivation of native species of fish and shellfish. Proposals for the cultivation of exotic, non-native species will be rejected outright and applicants directed to the attention of the National Environmental Management Council and Aquaculture Division.

1.7.2 Strategy 2. Combat/Prevent coastal environmental degradation results from mariculture trials and practices.

(a) Projects that cause significant environmental impacts cannot receive a Minor Permit

- Permits will not be issued for a proposal with a high likelihood of causing significant environmental impact to the estuary and land where it is located.
- Pond operations should not cause harm to endangered species and protected areas.
- Pond operations should not interfere with adjacent uses in any way that cannot be mitigated or compensated.

(b) Existing operations will be regularized

Existing ponds will be required to submit information documenting the nature of their operation so that permits can be regularized to remove any uncertainties for the benefit of the district as well as the permit holder. The District will work with each pond operator to identify and rectify any issues of inconformity with this ordinance.

(c) Maximum extent of pond operations in an estuary

Bagamoyo has 2 estuaries in the four wards where fish pond development will be permitted (an estuary consists of the coastal area where fresh water from the land mixes with sea water, usually semi-enclosed by a barrier beach or spit). To protect environmental quality in these areas, it is the policy of Bagamoyo District to issue its minor permits for mariculture related pond construction to an area that is no more than 5 ha of each area of suitable sites. The intent is to avoid the accumulation of impacts that could damage the environment of these areas as well as interference with other activities in the area.

1.7.3 Strategy 3. Enhanced coastal communities livelihood through improved mariculture practices

(a) Incentives for the development of small scale mariculture projects

To minimize conflicts and ecosystem impacts, it is the policy of Bagamoyo District that earthen pond mariculture that meets the standards and criteria described below be encouraged for the economic well-being of its communities. The procedures for obtaining Minor Permits issued by the District shall not require the applicants to bear an undone burden in meeting standards of proof or in the lengthy and costly proceedings. The District will have 30 business days from the time of accepting an application to issuing the permit.

(b) Best business and pond management practices

The District of Bagamoyo seeks to encourage the establishment of well-run pond operations that produce the intended products, are resistant to damage and disease and does not cause such problems to others, and are managed in ways that generate the revenue necessary to cover costs and allow for maintenance of the operations. Applicants are encouraged to seek technical assistance on the design and operation of their facilities as well as adopt best business management practices.

PART II

2.0. MARICULTURE PRACTICES AND ZONING IN BAGAMOYO DISTRICT

2.1. Current situation on mariculture practices

Available records suggest that aquaculture was first introduced in Tanzania in late 1940s. It is being estimated that the industry produces about 3000 tons of fish annually, from more than 8000 ponds scattered all over the country. Most fish farmers in the country prefer to produce Tilapia species especially the *Oreochromis niloticus* though there are many other species that could be farmed successfully.

Mariculture trials in Bagamoyo have a long history. Prawn farming on the other hand is traced back to 1980s. In 1986 a Norwegian company Batarz Group proposed a joint venture with the Bagamoyo Development Cooperative in the developing a medium-sized semi-intensive prawn farm North of Bagamoyo. Other medium scale commercial initiatives have recently commenced production in the same area. A company called Grammack started production but later on stopped. Currently, various forms of mariculture practices are taking place which includes but not limited to, seaweed and milk fish farming and crab-fattening

The most successful case of mariculture development in Bagamoyo District is seaweed farming of the red algae, *Euchema spinosum* and *Euchema cottonii* conducted in Mlingotini village with some trials in Mbegani and northern coast.

Shrimp farming is another aspect of mariculture in Bagamoyo, which is growing very fast and showing promising future. Currently, shrimp farming is commonly conducted in Changwaela and Mbegani coastal areas. Farmed species includes; white shrimps (*Fenneropenaeus indicus* (formerly known as *Penaeus indicus*), giant black shrimp (*P. monodon*), and tiger shrimp (*P. semisucatus*). It is anticipated that the development of hatchery for marine species currently under construction at Mbegani Fisheries Development centre will foster mariculture practices.

2.2. Problems facing mariculture development in Bagamoyo District

Mariculture development in Bagamoyo faces a number of problems which partly have contributed to under-development of the industry. These include:

- Unavailability of source of good seedlings or fish fingerlings
- Lack of knowledge and skills required for production of quality seeds and fish feeds,
- Inadequate extension services to monitor and evaluate mariculture activities
- Inadequate water supply especially due to weather and climate change impacts which changes water compositions (limnological factors)
- Inconsistency of mariculture products to the existing markets

Despite these setbacks, coastal communities extensively practice fish farming with most of the systems being part of salt production ponds. Price of cultured fish and seaweed is another challenge to farmers, which needs to be addressed along with improvement of processing and handling techniques as well as adding value to mariculture products.

2.3. Mariculture zoning, estuary profiling and seed scouting in Bagamoyo District

During mariculture suitable sites analyses for the coast of Bagamoyo, most of the sites which were surveyed were mapped through taking coordinates with GPS and they were qualified to be right candidates for mariculture activities. The main idea of mapping these sites is to determine how much land has been used for mariculture activities, carrying capacity of the total land as well as to set proper procedures for establishment such kind of activities. Apart from available land, seeds/fingerlings availability for stocking is crucial when considering establishment of mariculture farms. Potential sites for fish fingerlings collection were identified whereby during rainy seasons fingerlings are readily available in plenty and thus the establishment of mariculture farms will have to follow the seasonality.

Similar to zoning of suitable mariculture sites, there was a need to identify and locate all entry points to all specific salt flats along the coast and to be layered with mariculture maps for consistency of documentation of the coast regarding mariculture activities. This is due to the fact that, these estuaries/creeks are the ones which determines the sustainability of mariculture activities for the specific selected areas.

2.3.1. Saadani Village

The northern part of Saadani village also has a reasonably large area suitable for mariculture activities but not larger than that in the south. The common unique feature observed is that all these area are visited by wild animals including those which are very dangerous like lions and elephants.

There are three small sites on the edge and to the south of village. These sites are within residential area and are owned individually. They are characterized by natural water flow, not located in SANAPA, if fish farms established within these sites could be a model for training others. Their size differs from one another whereby Site 1 is approximately 1.25 hectares, Site 2 is approximately 3 hectares and Site 3 is approximated to be 7 hectares. Part of the larger site (Site 3) is fed by Chamamba Creek.

In Saadani Village there is Marumbe salt flats where found abandoned old salt works. Small group salt works using wood to evaporate sea water from mangroves and Stamico salt company. The southern part of Saadani village is one of the largest sites for salt production in Bagamoyo District. The nearby area (Kajanjo-just a small village) is a fishing camp where by sometimes the fishers are the ones who works with salt company STAMICO). This area is unique in the sense that it has large number of fingerlings for prawns and milk fish which could be seen by eyes without any difficulties. Apart from that, the salt pans were visited by wild birds which signified the availability of fish in such ponds and thus the suitability of the site. It has low topography (water flows in naturally during high tide) and the soil type generally clay with high retention of water.

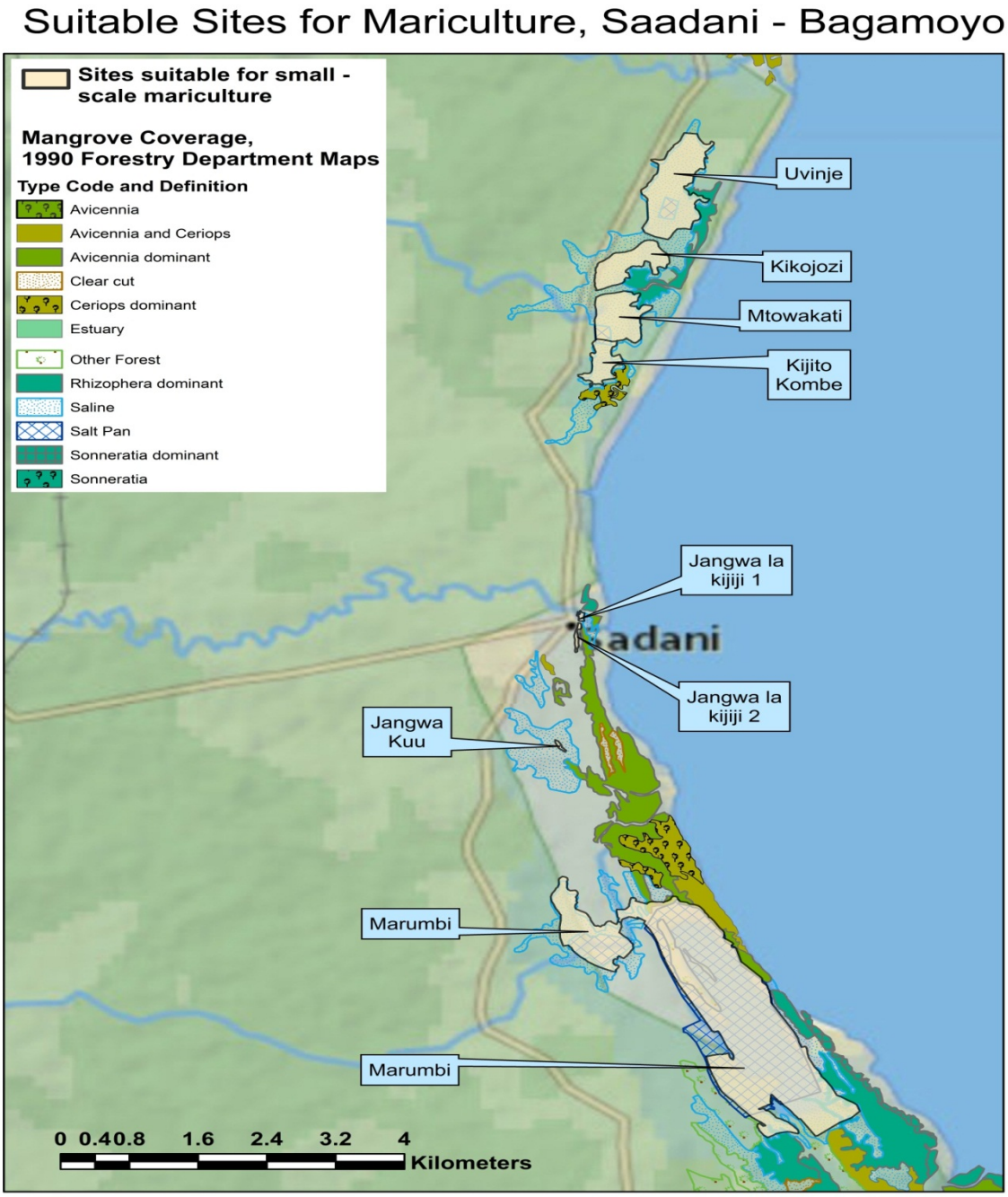


Plate 1: Representatives of Suitable sites for mariculture activities in Saadani Village

2.3.1.1. Wami River Estuary

No fish farming should occur in Park controlled Wami estuary.

2.3.2. Kitame Sub-Village

The main difference of this location compared to other sites in the coastal villages in Bagamoyo, Makurunge area (RAZABA and Kitame villages) is that there are fish ponds which technically well-made, and would be excellent for milk fish farming but currently the owner does not use them. The community members suggested that TCMP should facilitate negotiations for the community members to be allowed to hire such sites from the owner to farm milk fish.

Some parts along the coastline where there are no mangroves contain clay soil with high water retention capacity with rivers of salt water feeding the sites naturally. This makes the area a suitable candidate for mariculture practices in Bagamoyo. It has more than 20 sites (with both manmade and natural ponds) currently used for salt production and inshore small-scale fishing.

Kitame Salt works could be zoned as appropriate for mariculture, but these ponds are actively used for salt production. However, there are a few salt flats which are located nearby the residential area and are owned by the village in which these can be used by the village with no problems.

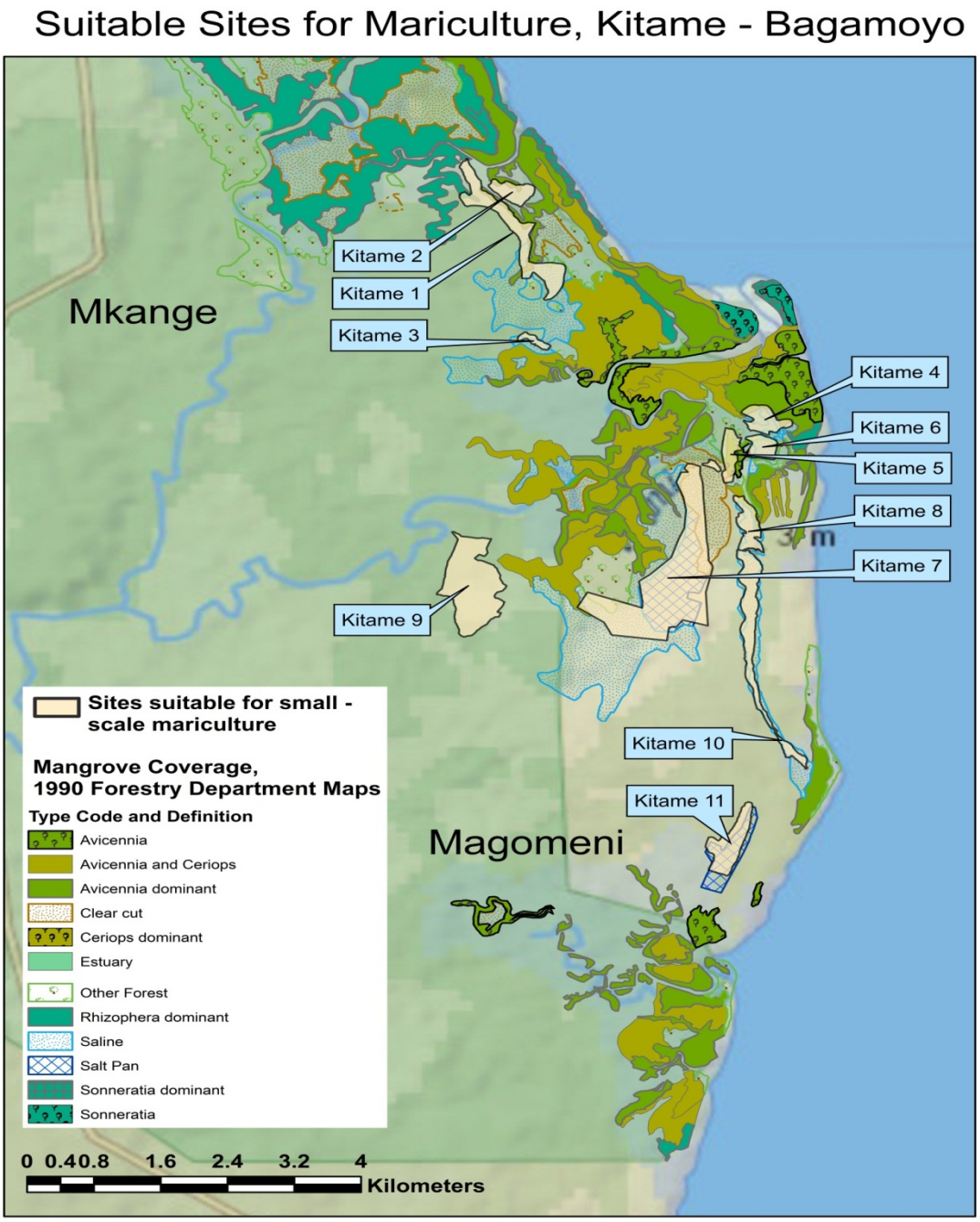


Plate 2: Representatives of Suitable sites for mariculture activities in Kitame Sub-Village

2.3.3 Razaba Sub-Village

On the way to RAZABA village there is a large coastal plain, with low areas and apparent drainage channels, having no obvious potential for small scale mariculture. This location would benefit from a specific area-wide planning project.

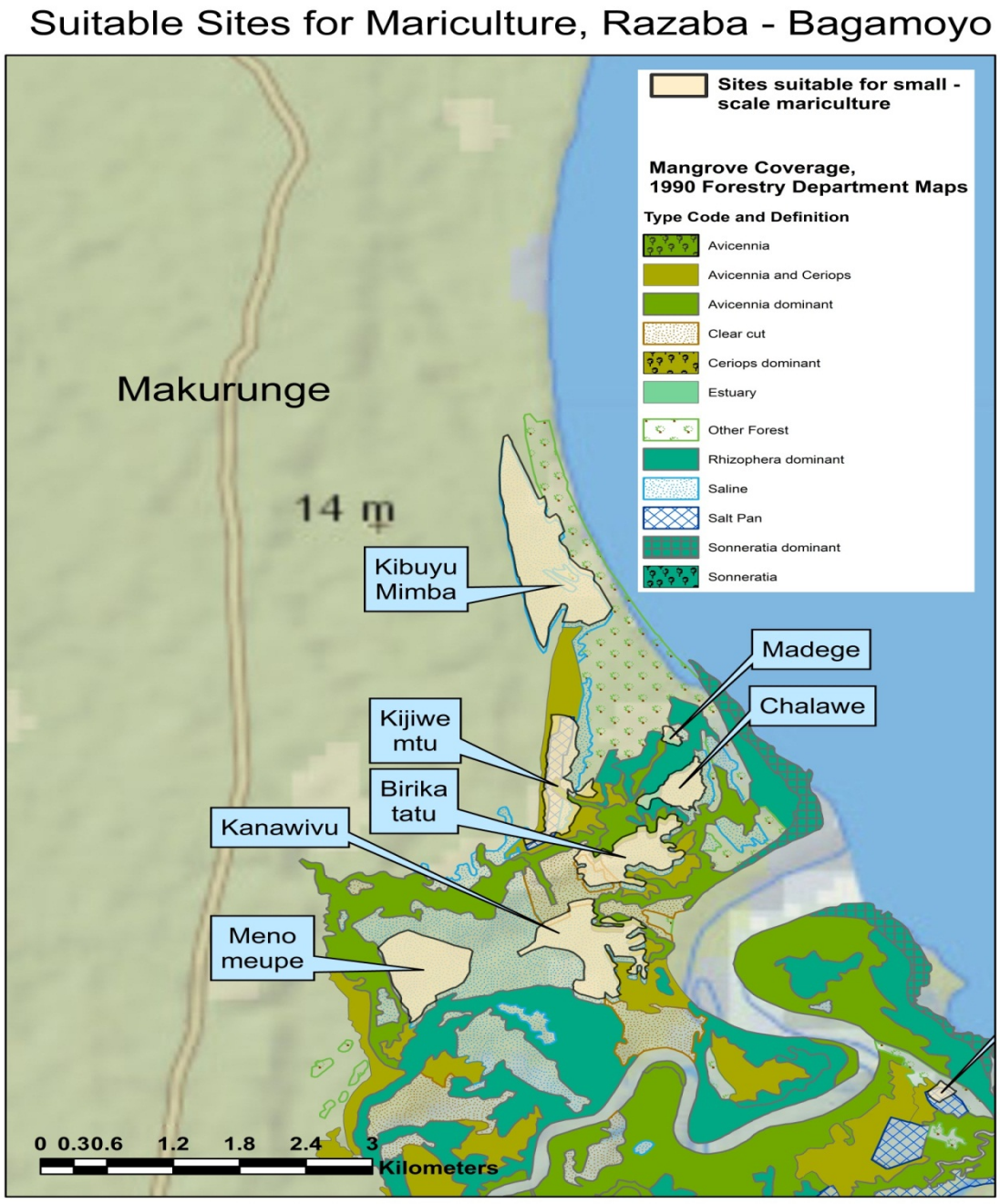


Plate 3: Representatives of Suitable sites for mariculture activities in RAZABA Sub-Village

2.3.4 Ruvu Estuary

North of the river: there is one large site with potential for mariculture but it was abandoned some time ago. It is possible that the elevation of the ponds is too high above sea level. It might need a water pumping system, an investment which is not feasible for small scale mariculture practices. There is also a medium-sized site which formerly had mangroves on it and one small natural pond found with dead fish, probably due to high salinity.

2.3.5 Magomeni Village

The coastline of Magomeni village has couples of Salt flats which are mostly owned by private companies mainly for salt production. These owners pump water to fill out the salt ponds as the elevation of the ponds are relatively high. The ponds could be converted to larger fish farms or shrimp farms, but would have to be major investments due to the need for this infrastructure, thus out of the scope of this ordinance. However, some of these salt ponds and salt flats were mapped for keeping records.

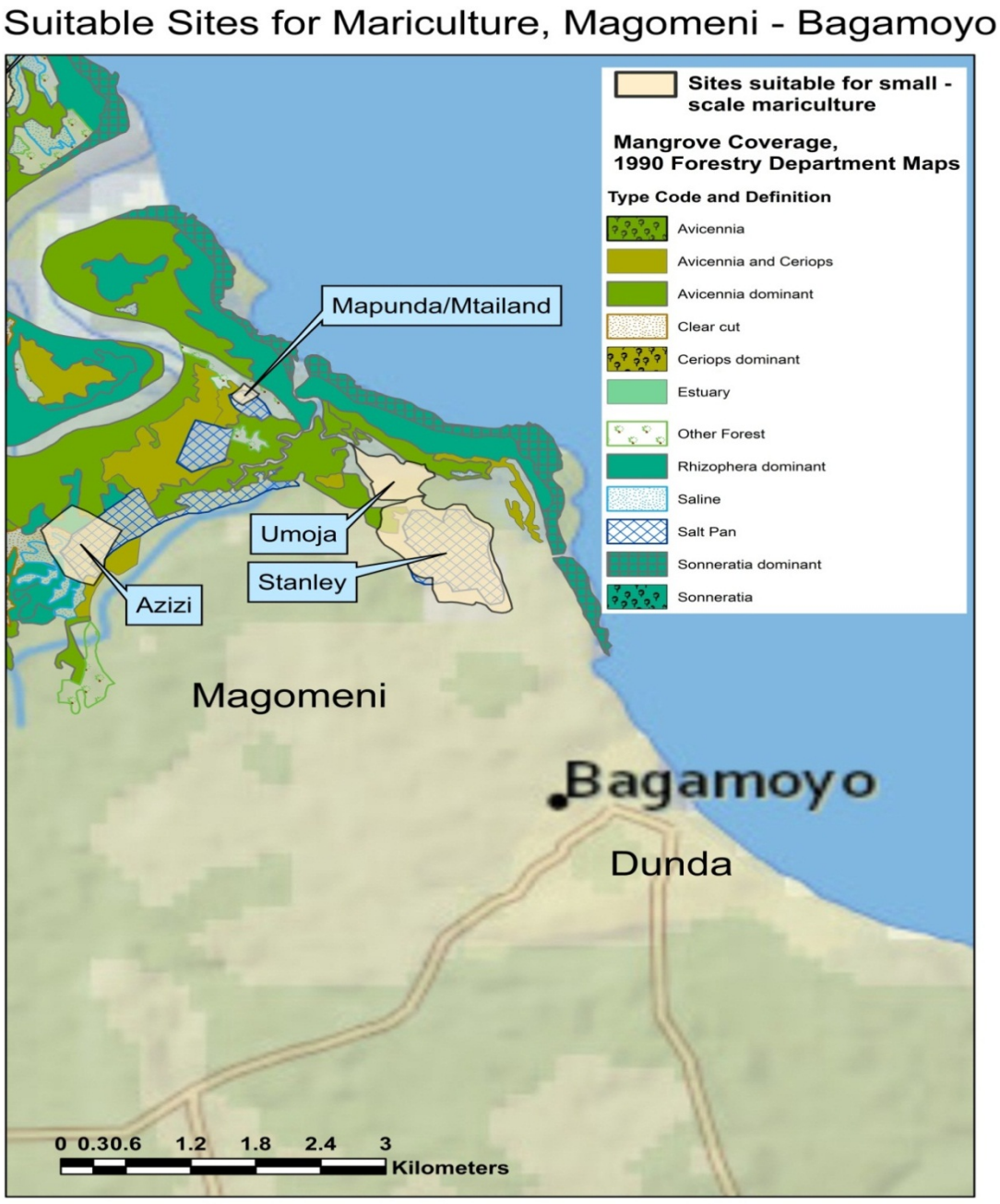


Plate 4: **Representatives of Suitable sites for mariculture activities in Magomeni Village**

2.3.6 Dunda

An intensive survey was conducted in this village but surprisingly, no site was found to qualify for mariculture practices. This is due to the fact that the area contains sandy beaches which are not suitable for construction of fish ponds.

2.3.7 Kaole Village

In this village there is only one site which generally considered suitable for mariculture practices. Currently part of the site is being used for salt production by villagers and part of it is idle. The Coordinates for this area were taken and local community in Kaole village agreed that the site to be zoned for establishing mariculture activities in near future.

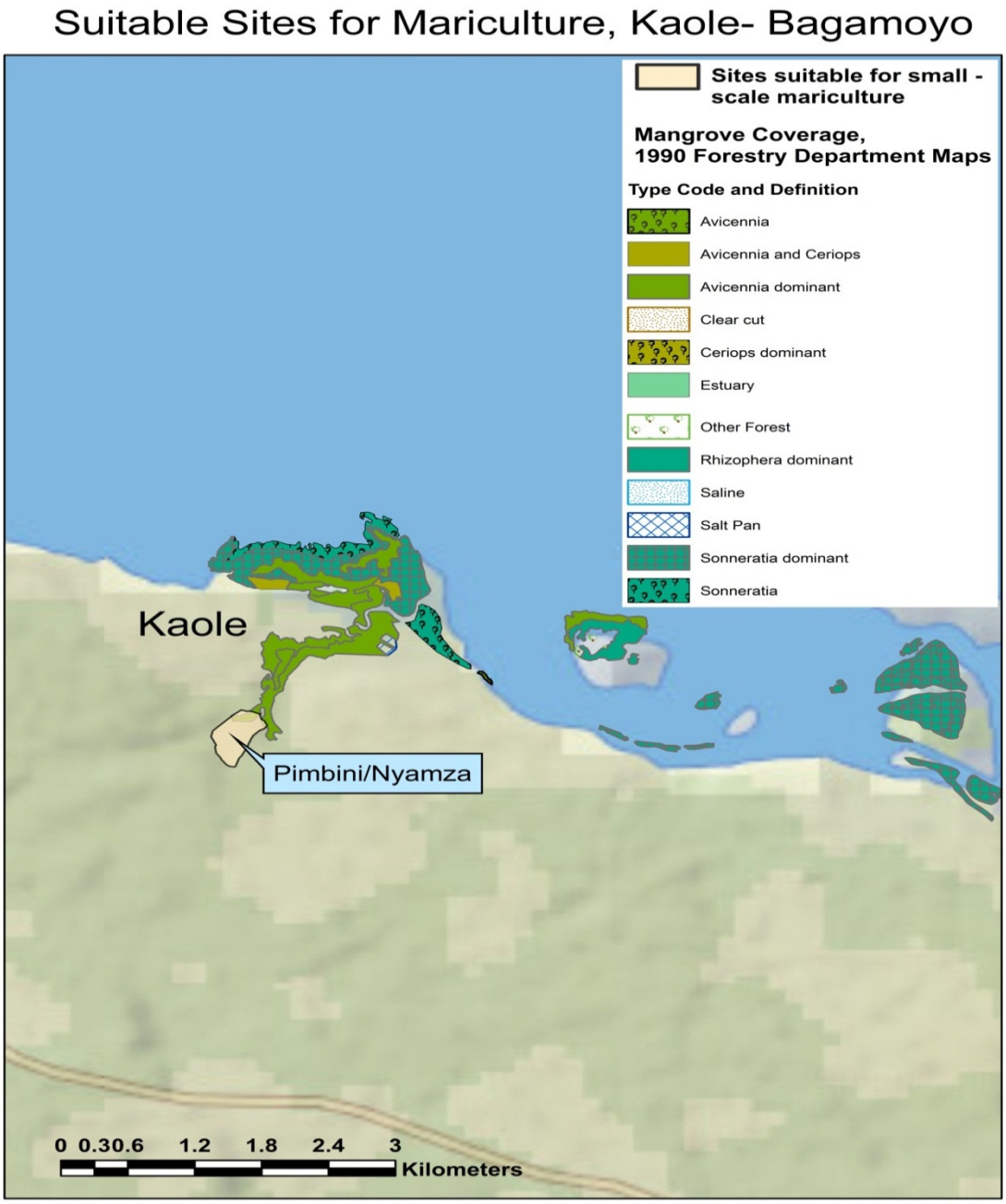


Plate 5: Representatives of Suitable sites for mariculture activities in Kaole Village

2.3.8 Pande

In this village there are no sites potential for mariculture practices. This is due to the fact that coastal area of the village is where Mbegani Fisheries Development Centre located. However, some villagers from Pande are involved in pearl oyster farming at the infra littoral area along Mbegani FDC. It was actually supposed to take coordinates surrounding the farm(s) of Pearl Oyster farms but it was not possible to make a quick arrangement for boat hence coordinates were not taken.

2.3.9 Mlingotini

There is no land based site along this coast suitable for constructing fish ponds. But this village has unique characteristics for seaweed farms within the tidal and intertidal area. Previously, Seaweed farmers in this area were by TCMP- SUCCESS Project to make trials on modern farming technology (floating lines). Coordinates surrounding this area were taken and this village will only concentrate on seaweed farming currently practiced as the main species grown mainly are Spinosum and Cottonii.

2.3.10 Kondo Village

Along the coast of Kondo village there are 11 Salt flats, some of these are Prison, Juwata, Manji, Mwarabu and Sadik. Generally most of these sites are suitable for establishment of pond mariculture activities.

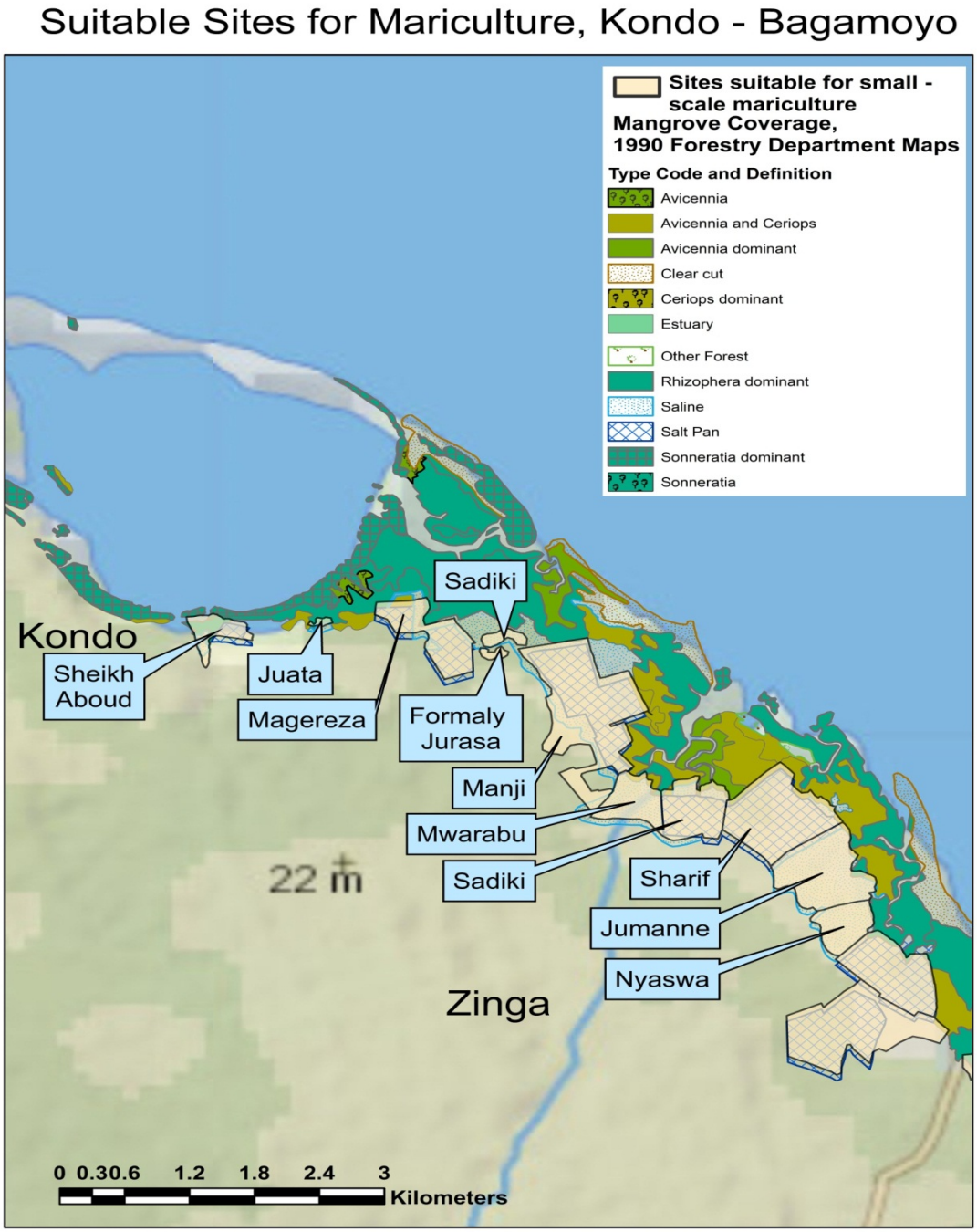


Plate 6: Representatives of Suitable sites for mariculture activities in Kondo Village

2.3.11 Mapinga Village

Mapinga village has a large area in terms of salt flats along its coast though these salt flats are mostly owned by private companies and utilized for salt production as major business. Mapinga village has a total of 2 salt flats, namely Stamico and Sabiru.

Apart from these salt flats, there are fish ponds that also owned by private owner named Reagent Estate, these ponds could be very productive and profitable if they were well managed and technically operated. Also in Mapinga village there is a fishing camp where nearby there is a small natural fish pond with a connection to the ocean. Although this natural pond supports fish lives but technically it was recommended not to be used for mariculture establishments. During periods of High-High Water Tides fish can escape to the sea. It was also recommended that dykes not be allowed in this area.

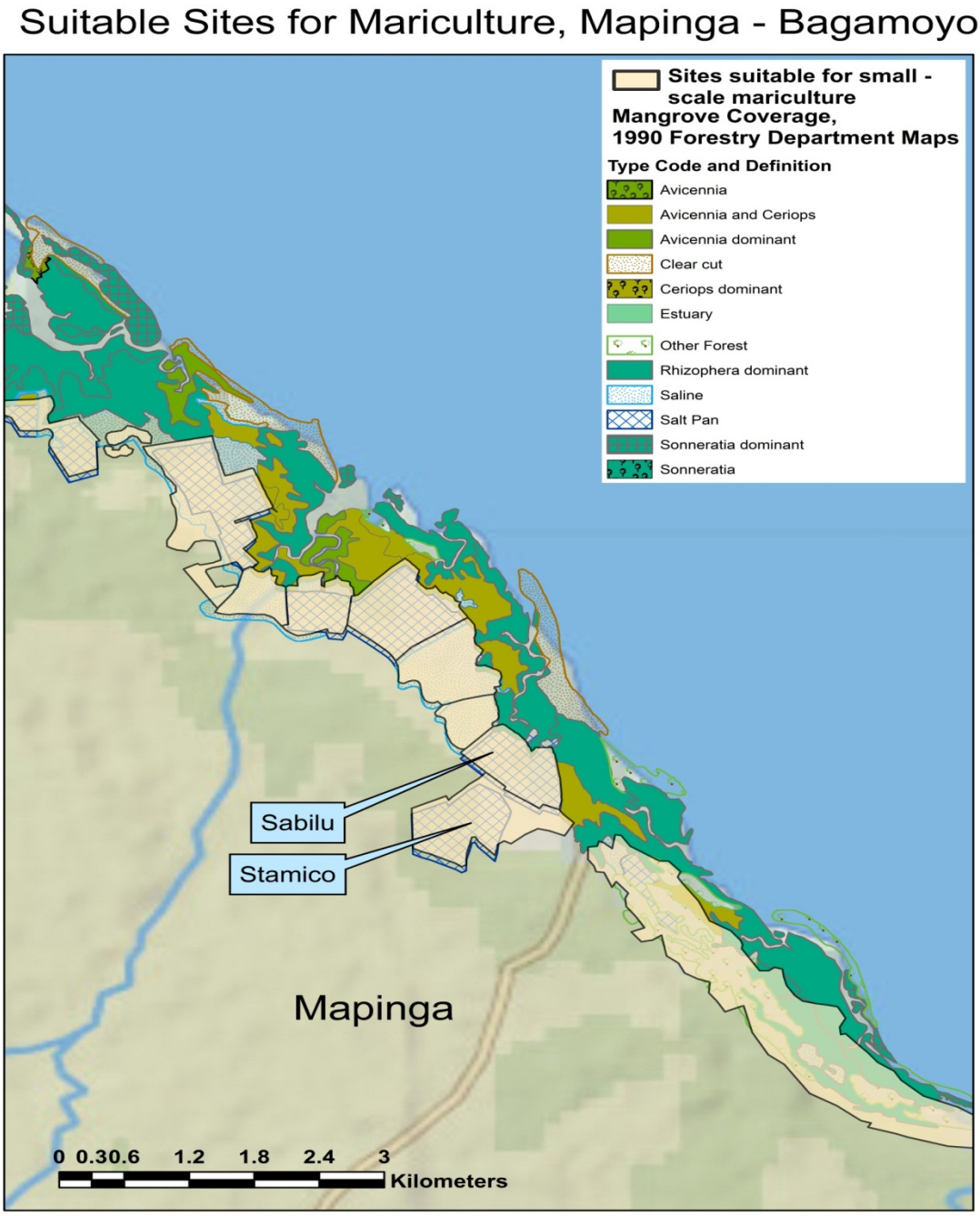


Plate 7: Representatives of Suitable sites for mariculture activities in Mapinga Village

2.3.12 Kiharaka village

Kiharaka village is where Bagamoyo District borders Kinondoni District. The Mpiji River forms the actual boarder. The Mpiji River together with other little rivers floods and fills water to the Two Major salt flats along the Kiharaka coast. During the mariculture site analysis the small-size salt flat was excluded from consideration, as it has no qualities suitable for mariculture activities.

The large-sized salt flat (also known as Muyonga site) was analysed. It is severely damaged as the result of an entrepreneur attempting unsuccessfully to establish multiple fish ponds. The work was carried out without technical consultation from Fisheries and other agencies. In addition the Muyonga site is clearly located within a major Mangrove Forest reserve area. As a result, this location should be considered as a high priority for the ecological recovery plan.

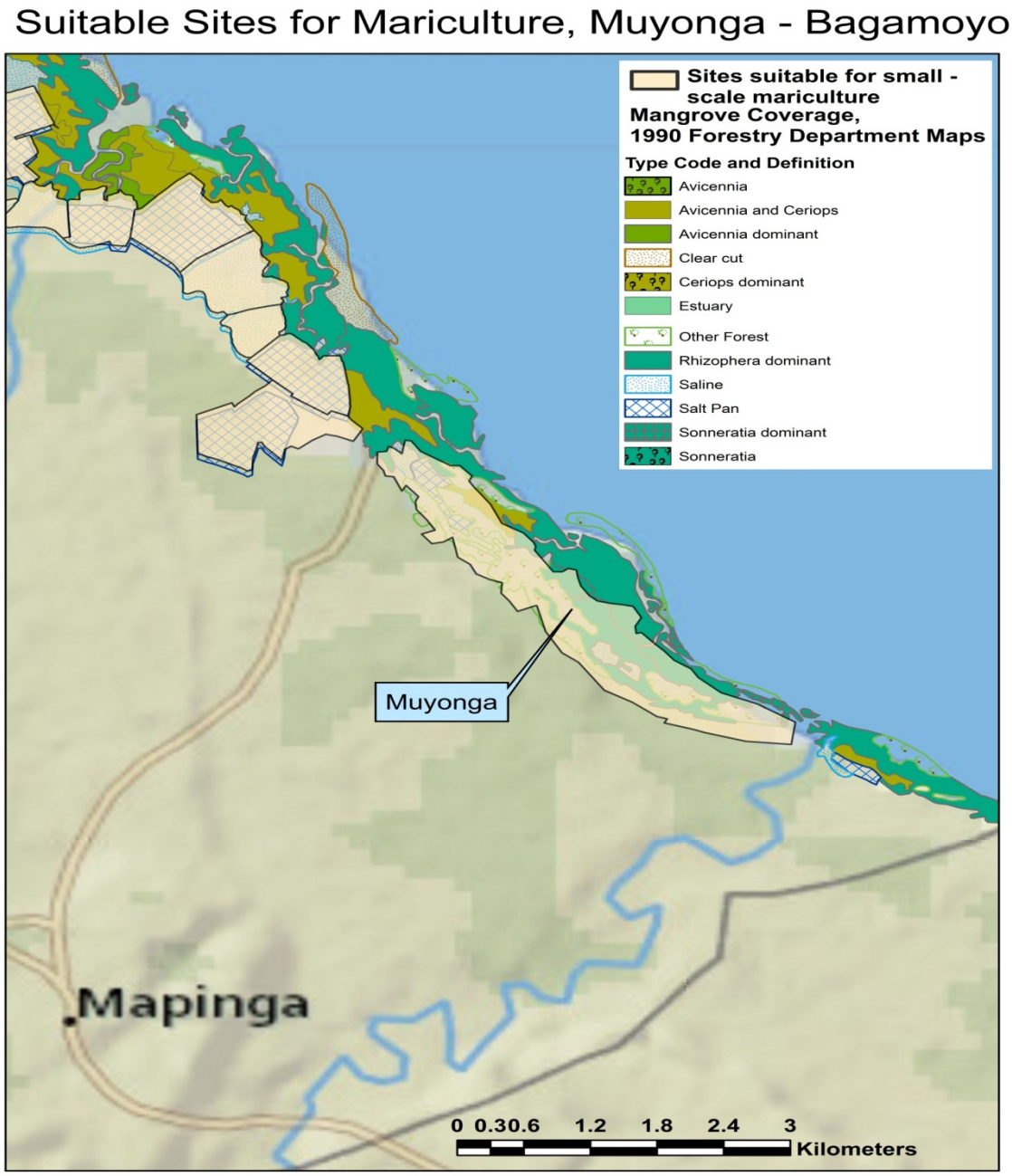


Plate 8: Representatives of Suitable sites for mariculture activities in Kiharaka Village

2.4. Site Analysis Requirement Prior to Villages Issuing the Approval

Mariculture development depends very much on reliable source of sea water. Creating a profile for a specific area is essential to identify the current status, future needs and its potential for development. A water source here means all entry points from sea water through mangrove forests to land which beyond them that can get tidal water twice a month. These points are associated with human activities and thus can be affected anthropogenically basing on the nature of the communities around that area as well as change naturally due to climate change. The process of profiling the sites involved the surrounding coastal communities for them to understand the results and the use of the findings. Adding to that, by collecting all information for a profile for each specific estuaries and creeks will have an important benefit to Bagamoyo District to update the coast as well as to ensure actions are appropriate and effective in the course of environmental and coastal resources conservation. On the other hand to understand the community to increasing awareness of its services, identify issues, problems and needs of such ecosystems. However, there are some areas which are in critical situation and thus they need recovery plans instead of mariculture activities establishments.

PART III

3.0. MARICULTURE MONITORING AND CONTROL IN BAGMOYO DISTRICT

3.1. Small Scale Mariculture Permit Procedure

The permitting procedure for small-scale mariculture activities shall follow the procedures described below using the forms and instructions provided in the Annexes as indicated. *The procedures are based upon those described in the Mariculture Investor's Guide*. However the Bagamoyo procedure shall be simple, easy to use and especially suitable for use at the community level. The District does not take on the responsibility for directly helping individuals or groups acquire sites, initiate or manage mariculture businesses. Important considerations that persons interested in initiating small-scale pond culture should take into account regarding site selection and fish pond operations are listed in *Annex 12*.

A potential mariculture pond in an existing salt works or other pond structure will be provided with the quickest review, and will not be considered as a new operator in terms of the limits on cumulative development of mariculture in the estuary where the farm is located mentioned in Strategy 1(c). Therefore, the investor only needs to be registered and be listed in the village mariculture roster. However, the investor should fill in an application standard form provided.

All other applicants are encouraged to consider carefully the size of the operation they ultimately wish to manage. This regulatory procedure is not intended to handle projects that do not conform to the basic requirements of eligibility described in Strategy 1(b). Applicants are discouraged from occupying the time of district authorities with requests that patently exceed this threshold. The District will exercise its right to reject such applications outright without detailed technical review or site visit.

For sustainable environmental and coastal resources use, establishment of any kind of Mariculture related projects should follow the Environment and Social management Framework (ESMF) and Resettlement of Policy Framework (RPF) as well as Environmental Impact Assessment (EIA) procedures should be followed.

- Early steps for conducting EIA for any project is SCREENING through PRA which will results into grouping of various project groups (A,B,C) basing on the type and nature of the project itself. Type A projects are regarded ad large projects which for this case does not fall under these Permit Procedures and are required to undergo EIA procedures by NEMC. Types B and C are moderate and small scale projects which most of cases are implemented by local communities , these may or may not undergo EIA procedure depending on (i) Type (ii) size and (iii) sensitiveness of these specific projects. However, these projects (B and C) have to be screened (*Annex 2*).

3.2. Application Procedures and District Review

Anyone having an idea to start a mariculture operation shall initially send his application for obtaining permit through the following steps:

A duly filled in application form *(Annex 3)* shall be submitted to the village government with application fee of which stated under specific section in Bylaws in each village where mariculture activities have to be established and including all the necessary attachments of land use permit, and 3 passport size photos.

If approved at the village level, the village government will send the application forms together with all the necessary attachments to the Council Technical Team (CTT) for preliminary review.

The CTT will examine the following aspects of the proposal:

Verify that the application is complete, including land permit (ownership or concession for the site from the Village, Ward or District)

Determine if the project meets the thresholds for Minor Permit. If not, then reject, recommend revision or recommend submission to the NEMC Major Permit process.

The thresholds for classifying an application as a Major Permit include the following:

- The project is greater than 10 hectares in size
- The applicant is not the party with title, ownership or concession for the site from the Village, Ward or District
- The project will generate significant environmental impacts through construction or operation, or is partly or wholly within a geographic area where aquaculture uses are prohibited
- The project involves intensive culture technology
- The project involves the cultivation of exotic species

If it is a minor operation, i.e. does not have significant impacts; then:

The CTT will conduct a field inspection of the proposed site. This should be done utilizing staff with appropriate technical expertise in collaboration with village government (VG) and a copy of the document submitted to Ward Development Committee (WDC)

The CTT will review the proposed project design to insure that the activities can in fact be accommodated at the site, that the applicant has the necessary legal and physical access to construct all of the required installations, and that no required technical aspect of the project has been left out of the application.

The CTT will confirm that the project falls within the areas predetermined as potentially suitable for aquaculture, is compatible with adjacent uses and is consistent with local development plans

The CTT will verify that the applicant has indicated where they will get the knowledge, financial resources and management ability necessary to carry out the project as proposed or revised.

The CTT will issue one of the following recommendation statements within 30 business days of receiving a properly completed application forms:

- Recommendation for rejection
- Recommendation for submission to NEMC as a major permit
- Acceptance conditioned on specified modifications to the application or conformity with additional conditions
- Outright acceptance

The CTT will forward the application with its recommendation to the Council Management Team (CMT) with a copy to the Ward Development Committee, who will submit to the District Council for approval. The District Executive Director (DED) shall write to the applicant and inform about the decision with a copy to Village government and provide information to the Aquaculture Division and NEMC for public record.

The District letter of approval will serve as evidence of a permit to operate the mariculture farm.

If the application is approved, the applicant must pay appropriate fees of 10,000/= (Ten thousand only).

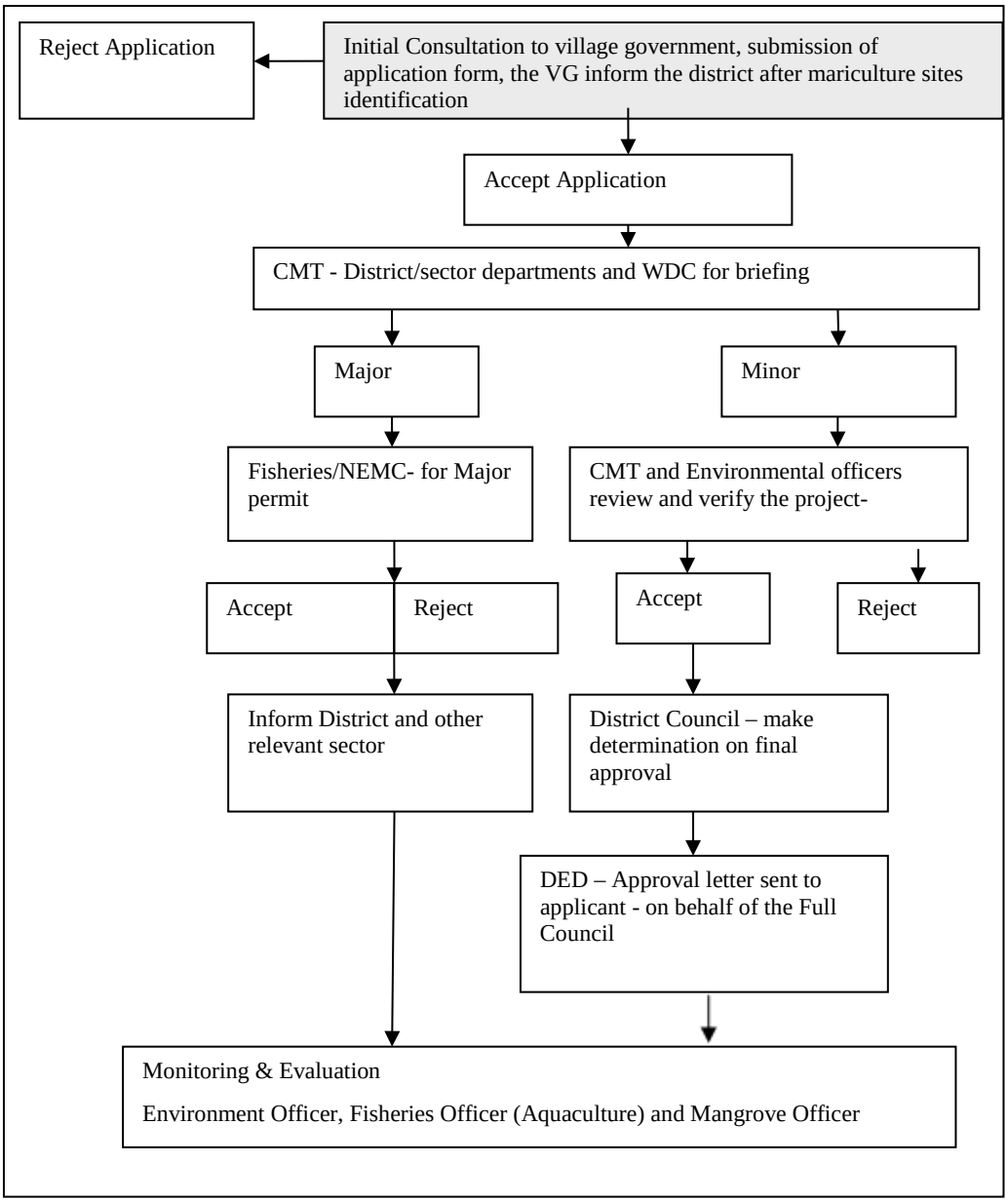


Figure 1: District Small scale Mariculture Permitting procedure

3.3. Monitoring and evaluation

Monitoring and evaluation of permitted operations is the responsibility of the District Office in particular ICM, environment, fisheries and forestry (mangrove) officers. Monitoring should determine if the terms on the project as permitted have been followed in order to avoid environmental impacts. In particular, it is important to monitor water which is discharged from the pond(s) in terms of quality and quantity. Water quality features of discharged waters for assessment include pH, salinity, specific density, and temperature. The capacity of the receiving water to dilute the discharge to acceptable levels should be considered.

3.4. Spatial Database

The District office shall maintain a database on mariculture activities with the following information taken from the application form, DTT review and field inspections. Data fields may include the following:

- Name of owner and manager
- Precise location determined using GPS coordinates
- Source of water (name of river, stream, estuary, or open sea)
- Number of employees
- Design of pond(s)
- Date of construction
- Number of ponds and total pond area (hectares)
- Source of fingerlings for stocking (e.g. hatchery or capture from the sea/estuary.)
- Species stocked and stocking density
- Date of harvests and amount harvested
- Critical difficulties (e.g. permit approval; stocking; growth rate; pond construction; water supply; harvest; transport of harvested fish; sale of fish)

PART IV ANNEXES

ANNEX 1: AREA COVERED WITH SALT FLATS BY WARD AND BY VILLAGE

Locations presenting existing areas of mariculture operations

Ward	Village	Location Name	HECTARES	Status
Mkange	**Saadani**	**Uvinje**	**75.197**	
		Kikojozi	**31.595**	
		Mto wa kati	**37.225**	
		Kijito Kombe	**18.061**	
		Jangwa la Kijiji-1	**0.889**	
		Jangwa la kijiji - 2	**1.523**	
		Jangwa kubwa/kuu	**0.711**	
		Marumbi	**397.922**	
Magomeni	**Kitame**	**Kitame 1**	**46.023**	
		Kitame2	**12.548**	
		Kitame3	**3.792**	
		Kitame4	**15.219**	
		Kitame5	**12.625**	
		Kitame6	**10.498**	
		Kitame7	**147.049**	
		Kitame8	**16.179**	
		Kitame9	**72.551**	
		Kitame10	**40.404**	
		Kitame11	**26.345**	
	RAZABA	**Kibuyu Mimba**	**97.585**	
		Kijiwe Mtu	**36.793**	
		Madege	**2.633**	
		Birika Tatu	**38.827**	
		Chalawe	**17.920**	
		Kanawivu	**58.888**	
		Meno meupe	**50.989**	
	Magomeni	**Mapunda/Mtailand**	**3.374**	**FP**
		Azizi	**40.936**	
		Umoja	**25.451**	
		Stainley	**97.553**	
Dunda	**Dunda**			
	Kaole	**Pimbini/Nyamza**	**17.988**	
Zinga				
	Kondo	**Sheikh Aboud**	**14.983**	
		Magereza	**36.631**	**FP**
		Sadiki	**5.312**	
		Jurasa	**2.428**	

Ward	Village	Location Name	HECTARES	Status
		Manji	**104.126**	
		Mwarabu	**25.250**	
		Sharif	**68.013**	**FP**
		Jumanne	**56.564**	
		Nyaswa	**22.820**	
Kerege	**Mapinga**	**Sabilu**	**49.527**	
		Stamico	**80.237**	**FP**
	Kiharaka	**Muyonga**	**28.025**	**FP**
TOTAL			**1949.209**	

N.B:

FP represents Fish Pond

* Estimate of areas based upon GIS analysis of Mangrove Forest Maps published in 1990 by the Ministry of Lands, Natural Resources and Tourism, Forest and Beekeeping Division. All field surveys of existing and potential mariculture suitable were supervised by Mutatina Alieth. from TCMP in 2010 where GIS and maps analysis were conducted by Jumanne Mohamed from TCMP with technical backstops from Don Robadue from University of Rhode Island.

ANNEX 2: IMPORTANT ASPECTS TO BE CONSIDERED DURING PROJECT SCREENING

- Will the intended project contribute to environmental and resources destruction? Yes/No

Comments:
……
……
……

- Will the intended project cause land, water or air pollution? Yes/No

Comments:
……
……
……

- Will the intended project shift the community? Yes/No

Comments:
……
……
……

- Will the intended project cause health problems? Yes/No

Comments:
……
……
……

- Will the intended project contribute to policy changes; e.g. Water Policy? Yes/No

Comments:
……
……
……

- Will the intended project affect local communities or individuals in the area which may cause more expenses in accessing available resources? Yes/No

Comments:
……

……
……

- Will the intended project affect land title ownership within the proposed project area? Yes/No

Comments:
……..

- Will the intended project cause conflicts due to negative impacts from the project after being implemented? Yes/No

Comments:
……
……
……

- For ensuring sustainable resources use, it is crucial to avoid all types of projects which does not comply with environmental good practices.
- To control environmental pollution caused by the proposed project e.g. handling of wastes (waste management systems)
- Proper uses of pesticides/insecticides while considering:
    - Correct type of the pesticides to apply
    - Right quantities to be applied
    - Observation of shelf lives of pesticide to be applied
    - Transportation of specific pesticides (from one place to another) and their storage
    - Proper clothing during application
    - Follow instruction for application
    - Hygiene for equipment to be used during application
    - Disposal of used equipment after application

ANNEX 3: APPLICATION FORM

THE UNITED REPUBLIC OF TANZANIA

THE FISHERIES ACT, 2003

(The fisheries (Amendment) regulations 2009)

(Regulations 77 (1) 80(1) and 81 (1))

APPLICATION FOR PERMIT TO CONSRUCT/RENOVATE/ADAPT A FISH ESTABLISHMENT

PART 1 (To be filled by an Applicant)

I /We*hereby apply for permission to *construct/renovate/adapt or modify a fish establishment under the Fisheries Act 2003 and Regulations made there under

Name of Applicant

.....

Name of Firm/Company.....

Full names and contact addresses of shareholders and directors .....
.....

Establishment approval number (if applicable) .....

Physical businesses address .....

Email address..... Tel. No. ..... Mobile phone .....

Plot No. .....

Number of employees .....

Ice plant capacity ..... Chiller capacity .....

Cold store capacity .....

Type of establishment (intended/product type) .....

Type of work required (construction/renovation of structures

etc.) .....
.....

Full name and signature of applicant ..... designation .....

Date .....

Official stamp .....

PART II

(to be filled by District Fisheries Officer)

Approval for a permit to ..... a fish establishment *granted/not granted

Additional
information .....
.....
.....

....

Name of Fisheries Officer Signature Date

.....

Official stamp

*delete whichever not applicable

ANNEX 4: REGISTER FOR AQUA FARMERS

THE UNITED REPUBLIC OF TANZANIA

THE FISHERIES ACT, 2003

(The fisheries (Amendment) regulations 2009)

(Regulations 38 (1))

District..... Region.....

Name of Authorised Officer.....Designation.....

S/N	Name of Aqua-farmer	Approval Certificate Number (APP)/	Location (Village)	Pond Number	Farm Size	Species Cultured	Source of seed	Type of Culture system	Type of Technology	Production per hectare per year

Signature of Authorised Officer..... Date.....

Official Stamp.....

ANNEX 5: LOG BOOK FOR FISH FARM MANAGEMENT

THE UNITED REPUBLIC OF TANZANIA

THE FISHERIES ACT, 2003

(The fisheries (Amendment) regulations 2009)

(Regulations 39 (2))

Region..... District..... Owner's Name.....

Approval Number.....Culture Technology..... Specie.....

Date	Water Quality	Stocking Weight	Feeding Rate	Feeding Regime	Growth Rate	Type of Disease	Measure Taken	Harvesting Date	Weight of fish	Expenditure	Profit	Remarks

Name of Authorised Officer.....Designation.....

Signature of Authorised Officer..... Date.....

ANNEX 6: LOG BOOK FOR SEAWEED FARM MANAGEMENT

THE UNITED BREPUBLIC OF TANZANIA

THE FISHERIES ACT, 2003

(The fisheries (Amendment) regulations 2009)

(Regulations 39 (2))

Date	Water Quality	Source of Seed	Growth Rate	Type of Disease	Measure Taken	Harvesting Date	Weight of Seaweed (dry)	Expenditure	Profit	Remarks

Name of Authorised Officer.....Designation.....

Signature of Authorised Officer..... Date.....

ANNEX 7: AQUACULTURE PRODUCTION DATA

THE UNITED BREPUBLIC OF TANZANIA

THE FISHERIES ACT, 2003

(The fisheries (Amendment) regulations 2009)

(Regulations 39 (3))

Name of Farm Owner.....

District.....Region.....

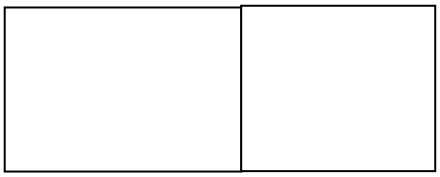
Approved certificate No.....

Name of Authorised Officer.....Designation.....

Date	Stocking Date	Stocking Rate	Species	Culture Technology	Area of farm (square metres)	Harvesting Date	Production			Remarks
							Pieces	Weight	Value in Tshs.	

Signature of Authorised Officer..... Date.....

ANNEX 8: CERTIFICATE OF APPROVAL FOR FISH OR AQUACULTURE* ESTABLISHMENT



THE UNITED REPUBLIC OF TANZANIA

THE FISHERIES ACT, No 22 OF 2003

(The fisheries (Amendment) regulations 2009)

(Regulations 77 (11) 80(7) and 81 (7))

This is to certify that the fish/ Aquaculture establishment (name).....

With approval (APP. No).....Owned by.....

Located on Plot No.....situated in.....

(village/township/ocean)* has been inspected and found to be compliant for the purpose of (farming/holding/preparation/processing/storing/transporting/fishing/collecting)*.....
.....
.....

Subject to the following conditions:

The Fish or Aquaculture establishment shall conform to the requirements of Fisheries Act, 2003 and its Regulation thereof

This approval certificate is not transferable

Any change in the ownership of this Certified Fish or Aquaculture establishment shall automatically invalidate this certificate.

This certificate shall be displayed conspicuously in the Fish or Aquaculture establishment.

This certificate is valid from.....to.....

Full name of Fisheries Officer.....

Signature..... Date of issue.....

.....

Official Stamp

*Delete whichever is not applicable

**This permit will be valid for 3 years renewable while considering environmentally friendly uses

ANNEX 9: ROUTINE MONITORING OF HATCHERY AND GROW-OUT FARMS

THE UNITED REPUBLIC OF TANZANIA

THE FISHERIES ACT, 2003

The fisheries (Amendment) Regulations, 2009

Regulation 77(15)

Name of establishment/Farm .....

Certificate number; APP No. ..... name of owner .....

Current production capacity.....

Address..... Telephone No. .....

Date of inspection.....

Ref. Std: QA/RS/29 Routine monitoring of hatchery and grow-out farms

ELEMENTS TO INSPECT		m	M	S	C	Remarks
1.0	Infrastructure					
1.1	Is the road to the establishment in good condition for easy accessibility?					
1.2	Is the office site in good working condition?					
1.3	Is the laboratory in good operation condition to facilitate laboratory analyses?					
1.4	Do the storage room have pallets for hygienic feed storage?					
1.5	Do the chemical store room restricted from free entry?					
1.6	Do the washroom meet hygienic requirements (such as having flowing water, detergents,					

ELEMENTS TO INSPECT		m	M	S	C	Remarks
	disinfectants, soap) and is in good operation condition?					
1.7	Is the position of the septic and soak pit tanks of the washroom do not allowed seepage or spillage to the culture system?					
1.8	Whenever applicable, is the location of the garage or fuel tank does not encourage fuel seepage/contamination to the culture system.					
1.9	Does all necessary requirement for hatchery/grow-out farm structure/facilitates in good working condition					
2.0	Culture Practice					
2.1	Is the culture setting (system) identified with unique name and size in surface area?					
2.2	Is there any record identifying gametes, eggs, species and number of fish stocked in the culture system?					
2.3	Does culture setting (system) such as open pond, raceway, tank or cages adhere to the culture system of the kind of species cultured and culture technology?					
2.4	Is there any possibility of the culture system to contain or capture wild fish, fish eggs or gametes as the result of facility, construction, and impoundment of water?					
2.5	Is there any possibility for the fish to escape into the surrounding, water catchment?					
2.6	Is the feed and feeding practise adhered to?					

ELEMENTS TO INSPECT		m	M	S	C	Remarks
2.7	Is fish feed prepared or obtain from certified producer?					
2.8	Is the record for sources of fish, gametes, fingerlings or seedlings cultured in the hatchery of farm properly kept?					
2.9	Are records of monitoring activities in place?					
3.0	Equipment and management practices					
3.1	Is fish handling equipment or harvesting gear not shared among cultured system within the farm?					
3.2	Is fish handling equipment or harvesting gear not shared among the farms?					
3.3	Are chemical. Physical and micro biological analysis of water and segment timely done?					
3.4	Is a vehicle or any article used to transport fish, gametes of eggs placard with signage indicating that the equipment is being used to transport the said items?					
3.5	Are chemical in use still within the expiry date?					
3.6	Is a good laboratory manual and method/standard operating procedures in place?					
4.0	Fish Health Management					
4.1	Is the hatchery/culture systems surrounding kept in good states of cleanliness?					
4.2	Is the record of signs or epidemic diseases infection to fish kept?					
4.3	Are the emergences of fish infection reported to competent Authority in time?					

ELEMENTS TO INSPECT		m	M	S	C	Remarks
4.4	Is the water inlet/outlet canal well maintained?					
4.5	Are grasses/shrubs well-trimmed to prevent vermin, pests and fish enemies' hideout?					
4.6	Is the bin for the dead fish and disposal available and operational?					
4.7	Is the storage bin for dead fish well secured from scavengers?					
4.8	Are the uses of needle and syringe for blood sampling, vaccination and artificial bread sterilized and incinerated before disposal?					
4.9	Is the environmental condition within the hatchery and farms maintained within the acceptable limits of the stock?					
5.0	Safety of produced aqua-farm products					
5.1	Are there qualified staffs to manage aqua-farm products?					
5.2	Is fish production procedure complied with the good manufactured practices, sanitary Standard Operating Procedure and hazard analysis and critical control point systems?					
5.3	For the harvested fish, hygiene instruction posted in place?					
5.4	Are there separate rooms/apartments for washing trays and bins?					
5.5	Are there effective system to control insects' ingress and dusts?					
5.6	Are fresh fish storage facilities such as cold room, ice boxes, in good working condition?					
5.7	Are racks for drying seaweeds					

ELEMENTS TO INSPECT		m	M	S	C	Remarks
	properly constructed and is in good conditions?					
5.8	Are packaging of fish and fisheries product in good hygiene conditions?					
5.9	Are pallets available?					
5.10	Are they made of non-wooden and non-corrosive material?					
5.11	Are there adequate vermin proofing and appropriate protection facilities?					
5.12	Is fumigation conducted by an approved organisation? Is certificate in place?					
5.13	Are by-products bin equipped with adequate lids?					
5.14	Is ice produced from portable water?					
5.15	Are ice stored in a containers designed for this purpose?					
5.16	In case clean water has to be transported to the processing plant, is track or container used to carry water from the sea approved?					
5.17	Whenever applicable, is there water filtration, purification system?					

OVERALL RATING

A KEY to non-conformances **m**=Minor, **M**=Major, **S**=Serious and **C**=critical

Comments/Recommendations.....
.....
.....
.....
.....
.....
.....

(NB: in case of limited space, please write REMARKS on the blank page)

Hatchery or farm Inspector

Name.....Designation.....

Signature.....Date.....

.....

Official Rubber Stamp

ANNEX 10: CHECKLIST FOR THE VILLAGE GOVERNMENT COMMITTEE

Every person seeking a permit to build and operate ponds for growing finfish or shellfish need to demonstrate to the Village, Ward and District government that they have the permit to utilize, that their project will not negatively interfere with any other activities in the village where it is to be located, will not negatively interfere with projects or land use rights held by others, and that it is consistent with the development plans in the village. National law protects mangroves and the District will review the application to be sure that the project does not infringe upon mangrove areas, as well as to verify all of the facts presented in the application. If the village is satisfied with the proposal, it will submit the proposal and its recommendations to the districts for review by CTT. The village has the responsibility to give comments to the District to consider during the application review period. The village will be consulted again during the application review process before a final decision is made.

The Village is required to submit a letter of its provisional consent, together with comments to the District Fisheries Officer (Aquaculture), to accompany the applicants' submission.

Checklist for Village and Ward	Yes	No	Comments
Was the specific purpose of the project as described by the applicant reviewed?			
Was a written presentation of the project proposal submitted? Was it reviewed?			
Was a sketch map of the project area submitted? Was it verified in the field? Was it approved?			
Location of the project site. Was it indicated? Was it visited? Is it within an approved zone? Was it approved?			
Other activities in the area Are there other activities in the proposed project site? Are the activities related to aquaculture ponds?			
Possible conflicts between the project and other activities in the area. Are there possible conflicts?			

Checklist for Village and Ward	Yes	No	Comments
List of conflicts/concerns			
Development goals of the village and ward. Is the project consistent? How will it interfere with goals, plans and life in the village:			
Ownership or permit for the area where the project is to be carried out. Has the applicant an ownership/permit? If yes, is evidence provided?			
Ability of the applicant to implement the project. Is the applicant able?[1] Are there any concerns about the applicant? List of concerns:			

[1] At least financially and technically

[2] Ward is mentioned here as a power centre

ANNEX 11: CHECKLIST FOR THE DISTRICT TECHNICAL TEAM

The role of the District Technical Team is to ensure that the applicant for a permit to build an aquaculture project has properly completed the application form, has consulted with the village and ward where the project is to be located, and possesses access to the location. The DTT is then is responsible for verifying the information in the application and evaluating the proposal in respect to the policies and rules set out by this ordinance.

The following worksheet is an aid to this review process.

Checklist for District Technical Team	Yes	No	Comments
1) Review the application form for completeness, preferably at the time the applicant submits it to the District office. This should include any other attachments as requested in the application form. Is it complete?			
2) Threshold Review: If any of the following are true, inform the applicant to either revise the proposal or submit the application for review by NEMC			
a. The project is greater than 10 hectares in size			
b. The project would result in more than 20 per cent of the combined mangrove and salt flats in the estuary containing aquaculture operations. Check with the Bagamoyo coastal aquaculture maps and related tables to calculate this.			
c. The per cent of the salt flat area that will be occupied by aquaculture ponds is more than 80%.			
d. The applicant is not the party with permit/, ownership or concession for the site from the Village, Ward or District			
e. The project appears to generate significant environmental impacts through construction or operation, or is partly or wholly within a geographic area where aquaculture uses are prohibited.			
f. The project involves intensive culture technology. The DTT does not have the legal and technical capability of reviewing this type of project.			

Checklist for District Technical Team	Yes	No	Comments
g. The project involves the cultivation of exotic species. The DTT does not have the legal and technical capability of reviewing this type of species.			
h. In the area concerned, the DTT have to check on the carrying capacity of ponds in the area			
i. Cumulative impacts			

Checklist for District Technical Team	Yes	No	Comments
3) The receipts for relevant fees are submitted to the relevant authorities. Has the application fee been paid?			
4) A copy of letter from VG that the site chosen can be/not developed as consent. Village letter received?			
5) Attach District coastal aquaculture maps, and confirm: - Location of the farm in relation to adjoining water way. - Existing vegetation type and cover e.g. Mangrove areas.			
6). Review the proposed project design to insure that the works and activities can in fact be accommodated at the site, Was the proposal reviewed?			
7) Confirm that the applicant has indicated to have the necessary legal and physical access to construct all of the required installations, and that no required technical aspect of the project has been left out of the application. Is the applicant a legal owner of the area? Has the applicant indicated to have the necessary requirements for the project? Are all the aspects of the project covered?			
8) Verify that the applicant has indicated where to get the knowledge, financial resources and management ability necessary to carry out the project as proposed or revised. Does the applicant has or has indicated how to get adequate knowledge? Does the applicant has or has indicated how to get financial resources for the project? Does the applicant has or has indicated how to get proper management plans for the project?			
9) Confirm that the project is physically compatible with adjacent uses and falls within the areas			

Checklist for District Technical Team	Yes	No	Comments
predetermined as potentially suitable for aquaculture, for example that soils characteristics are suitable for dykes construction etc. Is the project compatible with other activities taking place in the area? Are the environmental conditions suitable for the activity e.g. soil type, water quantity and quality?			
10) Confirm that the Type of species cultured are native species Are the intended species native?			
11) Confirm that the cultivation methods are extensive or semi-intensive only Is the farming intensive? Is the farming semi-intensive? Is the farming extensive?			
12) Review any concerns raised by the Village or Ward, on potential impacts of the operation and mitigation measures if any to keep its status as a Minor Permit. List issues List mitigating measures Are the concerns major? Are the concerns minor? Are there reasonable mitigation measures?			
13) Are the fingerlings of the intended species locally available?			

ANNEX 12: CONSIDERATIONS IN SITE SELECTION AND OPERATIONS

Not all salt flats are suitable for pond culture. In selecting ideal locations for an earthen pond for culture system, soil quality, water quality and quantity, socioeconomic and environmental factors should be taken into account. The location chosen should interfere minimally with sensitive habitats and other economic activities. The selected sites for earthen pond culture should have the following factors into consideration:-

1. Location

The ideal position for a pond is the one which can receive water supply by gravity or tidal flow, and discharge the used water under gravity. Ponds should be ideally located in areas where construction will cause the least disturbance to sensitive habitats or other economic activities. It is preferable that ponds not be located adjacent to already built areas or high density settlements. Protected areas, parks, and areas of cultural or spiritual importance should be avoided for pond construction.

2. Water quantity and quality

The availability of water being in quantity and quality is important all systems of mariculture. There must be a continuous and sufficient clean volume of water to satisfy the needs of the operation in all seasons, without affecting the needs of other users. Natural water flows should not be diverted in such a manner that the downstream use or habitats are impacted.

For fish to attain optimal growth, water quality should be at a level that is most favourable. It is therefore necessary pond managers monitor water quality parameters regularly. The optimum water quality conditions for milkfish farming are shown in table 1.

Table 1.Standard water parameters suitable for Mariculture

Parameter	Optimum
Dissolved Oxygen	3-5 ppm
Temperature	22-35^{o}C
pH	6.8-8.7
Salinity	18-32 ppt
Turbidity	0.5 m

3. Soil quality

Impermeable soil (e.g. loamy-clay) is the best with which to construct a pond. Acid sulphate soils should be avoided. Table 2 below shows the suitability of the different soil classes in pond constructions.

CLASS	RELATIVE CHARACTERISTIC		COMPACTION CHARACTERISTIC	SUITABILITY FOR DIKE MATERIAL
	PERMEABILITY	COMPRESSIBILITY		
Clay	impervious	medium	fair to good	excellent
Sandy clay	impervious	low	good	good
Loamy	semi-pervious to impervious	high high	fair to very poor	fair
Silty	semi-pervious to impervious	medium to high	good to very poor	poor
Sandy	pervious	negligible	good	poor
Peaty	-	-	-	very poor

Table 2 Relationship of soil classes and suitability for dike material

SOURCE: BFAR & FAO/UNDP Training Manual, 1980

4. Tidal characteristics and ground elevation

The suitability of a tide-fed site for a milkfish pond depends on the relationship between the tide characteristic of the area and its ground elevation. Areas with ground level that are too high or too low in reference to 0-datum are not economically suitable to be developed as a fishpond for it will require extensive excavation or filling. Areas reached only by the high spring tides should be ruled out as it is costly to excavate. Low areas on the other hand will require filling-up or else full draining will not be accomplished. The best elevation for a pond bottom would at least be 0.2 meter from the datum plane or at the elevation where 0.8 meter depth of water can be maintained inside the pond during ordinary tides. This index should satisfy the requirements of both fish and natural fish food. Photosynthesis should still be able to take place at the bottom of the pond to produce the benthic algal mat ("*lab lab"*), a natural food for milkfish and a lot of finfish and shellfish.

5. Flood hazard

Flooding is considered to be one of the most destructive natural disasters in the fishpond industry. Floods cannot be controlled completely, but it is important to know how a fishpond can be free to some extent from flood hazard. It is necessary to know the weather conditions in the area and determine the highest flood that occurred. High tide plus the highest flood level on record should be considered so proper diking and drainage can be planned. In Eastern Africa, the main rainy season is March to May when the fingerlings are more abundant. In addition to dike construction considerations, farmers may want to consider harvesting before the rainy season and restock the ponds just after the rainy season. This is considered important since some unpredictable flooding usually occur in connection with the equinox and related phenomenon (e.g. March 2007 episode)

6. Climatic conditions

Seasonal climatic changes are important in scheduling and managing fishpond operations. The climatic elements that concern most operators are rainfall, temperature and prevailing wind direction because they greatly affect fish production directly or indirectly. Data on rainfall and wind direction are necessary in planning the layout and design of pond system. Knowing the past rainfall record can help the investor decide on dike heights or whether to include drainage canals. Winds can also be very destructive since they generate wave action that can destroy the sides of the dikes. By knowing the prevailing wind direction, dike positioning can be planned, by exposing the least area possible to damaging waves. Heavy rain can suddenly change the salinity and temperature of pond water, which can be detrimental to fish. It is also important to know the period of the rainy season as this will affect pond preparation and stocking cycles. Drying of pond bottoms cannot be accomplished during rainy days but is a necessary step prior to stocking to reduce likelihood of disease outbreaks.

7. Type and density of vegetation

It is highly recommended that pond sites be selected primarily in salt flat areas behind mangrove stands. Large scale clearing is not recommended as it increases construction costs and is environmentally destructive.

8. Fingerling availability

The availability of fish fingerlings should be determined before the area for pond culture is located. The distance from the catch to the pond should be less than 3 hours of travel.

9. Supportive entrepreneurial

Environment

- Skilled and unskilled labour
- Infrastructure and telecommunication for supporting transportation of kilns, ice and other storage facilities and construction material.

Production inputs- seeds, feeds, fertilizers

- Financial sources/credit facilities
- Security and Bio-safety of products
-

10. Marketing

- Reliable markets