

The state of Monitoring, Control and Surveillance in the United Republic of Tanzania.

A report for SWIOFish by Pierre Malan.
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Executive summary

The United Republic of Tanzania was formed by the union of Tanganyika (Mainland) and Zanzibar on the 26th of April, 1964. Mainland Tanzania is governed by the national parliament. Zanzibar is a semi-autonomous region with its own parliament and president.

Fisheries management legislation in Tanzania is somewhat complex. Inshore fisheries are not a Union matter. Thus Mainland and Zanzibar each have their own fisheries laws that apply to the 12-mile territorial waters, while fishing in the EEZ beyond the 12-mile limits is controlled by the Deep Sea Fishing Authority, a semi-Autonomous agency empowered by its own Act. Coastal fisheries are of relatively minor importance in Mainland Tanzania, where the majority of fishing revenue is derived from the inland fisheries on the great lakes. Coastal fishing is important in terms of food security to coastal communities. Fishing is of greater importance in Zanzibar, as is usual in islands nations.

In both near shore jurisdictions much of the responsibility for fisheries management and MCS has been devolved to District level, and in particular to fishing communities themselves, by way of Beach Management Units on the Mainland and the Village Fishing Committees in Zanzibar. In addition to the devolved powers the Fisheries Division maintains centrally managed units in Tanga, Dar es Salaam, Mafia, Kilwa and Mtwara.

MCS in Tanzania is constrained by a lack of funding for activities such as the maintenance and operation of patrol vessels. Due to the devolved nature of fisheries management, the actual manpower available to especially the FRP on the mainland is small, and is not truly sufficient to exercise control over the fisheries.

The coastal and marine environment is threatened by issues such as urbanisation, overfishing and habitat destruction, in particular coral reefs and mangroves. Illegal fishing methods contribute greatly to the destruction of coastal habitats, but the biggest long term threat to coastal resources is the present open access fishery. The coastal fishery targets around 600 species, using a variety of fishing methods. As fishing is often the employment of last resort, the pressure on the resources is immense.

Although destructive fishing practices such as dynamite fishing are major threats in the short term, the effectively uncontrolled, and unknown, level of effort is more likely to cause long-term damage to the ecosystem. This has been seen in neighbouring Mozambique, where uncontrolled inshore fishing effort has led to diminishing catches, the use of mosquito nets and general impoverishment of the fishing communities.

In speaking to fishermen, I was often told that fishing has become the employment of last resort. This can only increase pressure on resources. A thorough study of the actual fishing effort is required to assess the situation.

MCS in Tanzania is hampered by an open access system that makes it almost impossible to control fishing effort. Co-management is a mainstay of the fisheries management system but is hampered by the fact that the members of the Beach Management Units in the Mainland and the Village Fishing Committees in Zanzibar effectively serve on a volunteer basis. In some cases these structures are subject to political and social pressures that inhibit their ability to function effectively. The reality is that fisheries law is poorly enforced, placing a strain on the marine environment and on the sustainable livelihood of the fishermen. Illegal practices, such as the use of beach seine nets, and

destructive methods such as fishing with explosives are widespread and in many cases are tacitly supported by local communities.

A lack of material and human resources hampers those responsible for enforcing the fisheries laws. In order to improve the management of fisheries in Tanzania the capacity of the fisheries departments, the BMUs and VFCs should be improved. This will involve improved and targeted training of fisheries officers, improved funding and management. BMUs and VFCs can be aided and empowered by means of mentors assigned to these units to help them in their tasks and provide technical back up.

Illegal and destructive fishing methods must be eliminated by means of increased enforcement and better investigation, prosecution and sentencing of related cases. Where a blanket ban on these methods may not be appropriate, safe use areas must be investigated, demarcated and licenced. Methods such as dynamite fishing must be eradicated by all means possible, including tracing and elimination of individuals and organisations behind the crime.

In order to bring about change and to improve the sustainability of the marine fisheries in Tanzania, a number of interventions are proposed. The most important are listed below.

- **Improving the licencing and registration of fishermen and fishing vessels.**
This is a first step toward limiting the number of entrants into the fishery and reducing fishing effort to a sustainable level.

- **Improving the monitoring of catch and fishing effort by artisanal and subsistence fishermen.**
Improving the quality of data collected by BMU/SFC to better reflect the state of the fishery. Training and compensating the members of the BMU/SFCs and providing regular feedback on the data for specific regions is aimed at improving participation and the quality of the data collected.
Improved funding for the BMU/SFCs and the possibility of instituting a mentorship system to improve capacity will be investigated.

- **Beach Seine Fishing**
Beach seine fishing is illegal, yet it is widely practiced. The modification of the blanket ban to allow the use of this gear in selected areas, together with strict enforcement in closed areas, will contribute to greater respect for the law.

- **Investigation of fisheries crime.**
Fisheries crime is often related to other types of organised crime. Training fisheries officers to investigate these crimes so that the perpetrators can be brought before the courts will aid in the fight against serious crimes such as dynamite fishing.

- **Improving the capacity to conduct air and sea patrols.**
The existing fleet of small, inshore patrol vessels run by the Fisheries Division need refitting in order to bring them back to an operational condition. Targeted patrols in priority areas will help to reduce illegal actions.
In the EEZ air and sea patrols are needed to establish the level of illegal activity in Tanzanian waters.

Funding for these patrols will be required until system are in place to generate sufficient funds from licencing and levies on catches.

- **Increase human capacity by means of training workshops and short courses.**
Training workshops and short courses for middle and senior management will sharpen skills in fields such as risk assessment, strategic planning and budgeting.

Acronyms

BMU	- Beach Management Unit
DSFA	- Deep Sea Fishing Authority
EEZ	- Exclusive Economic Zone
FAO	- The Food and Agricultural Organisation of the United Nations
FAO CCRF	- FAO Code of Conduct for Responsible Fisheries
FDD	- Fisheries Development Division
FETA	- Fisheries Education and Training Authority
FRP	- Fisheries Resource Protection Section
IOC	- Indian Ocean Commission
IOTC	- Indian Ocean Tuna Commission
IPOA-IUU	- International Plan of Action against Illegal, Unreported and Unregulated fishing
IUU	- Illegal, Unreported and Unregulated fishing
MACEMP	- Marine and Coastal Environmental Management Project
MALNR	- Ministry of Agriculture, Livestock and Natural Resources
MCS	- Monitoring, Control and Surveillance
NGO	- Non-Government Organisation
SADC	- Southern African development Community
SUMATRA	- Surface and Maritime Regulatory Authority
TAC	- Total Allowable Catch
TAE	- Total Allowable Effort
UNCLOS	- United Nations Convention on the Law of the Sea
URT	- United Republic of Tanzania
VFC	- Village Fishing Committee
VMS	- Vessel Monitoring System

1 Tanzania MCS Framework

The United Republic of Tanzania was formed by the union of Tanganyika (Mainland) and Zanzibar on the 26th of April, 1964. Mainland Tanzania is governed by the national parliament. Zanzibar is a semi-autonomous region with its own parliament and president.

1.1 Fisheries policy and law.

Fisheries in Tanzania is governed by split jurisdictions. The two parts of the Union, Mainland and Zanzibar, each have their own fisheries legislation applicable to the territorial seas up to 12 nautical miles offshore. (Zanzibar: Fisheries Act of 2010; Mainland: Fisheries Act of 2003.) Management and control of the EEZ has been devolved to a semi-autonomous agency, the Deep Sea Fishing Authority, (DSFA: Deep Sea Fishing Authority Act of 1998, as amended by the Deep Sea Fishing Authority (Amendment) Act of 2007) which is responsible for licensing vessels to fish in the EEZ, mainly for tuna and tuna-like species, and to ensure compliance with both Tanzanian legislation and the requirements of the Indian Ocean Tuna Commission, of which Tanzania is a full member.

Although the Fisheries laws of both Mainland Tanzania and Zanzibar are relatively new, there are weaknesses in these laws that make enforcement difficult. Mainland Tanzania is in the process of revising its fisheries law and it is hoped that the new law will remedy some of these weaknesses. Ideally the two laws will in the future be harmonised wherever possible.

Legal matters will be addressed more fully by a separate consultant, but from an operational MCS point of view it is important to note that accurate definitions are vital for successful prosecution of offences. This applies in particular to things like definitions of fishing gear and operations. Penalties should be set at a level that is punitive and will discourage offenders. Given the difficulties of amending primary legislation, penalties should either be defined in regulations, that are more easily amended, or in terms that will retain real value. One option in this case is to define fines as a multiple of market value of the catch and to include confiscation of fishing gear (including vessels) as part of the penalty.

1.2 Political will and support.

In 2009 the team of Fisheries Officers from four countries who were responsible for the arrest of the illegal fishing vessel Tawariq 1 were honoured by being invited to meet the President of Tanzania at State House. This was seen as support for the fight against IUU fishing at the highest level.

However, the general sentiment among people interviewed for this report is that that support is not visible at a more local level. On numerous occasions in both Zanzibar and on the Mainland I was told that local politicians either support illegal fishermen or turn a blind eye to their activities. It was also the contention that in some cases BMUs and VFCs are used as vehicles for political influence. I stress that this is all hearsay, but the frequency of the comments, and the consistency of the message indicates that there is at least some truth in the allegations.

Fisheries and the protection of the coastal environment is important for Tanzania both as a source of food for the coastal population and as a draw card for tourists, who make a significant contribution to the Tanzanian economy.

Tanzania has joined or acceded to a number of international agreements and treaties concerned with fisheries. This indicates that there is support for the campaign against illegal fishing at high level.

These include:

- United Nations Convention on the Law of the Sea (UNCLOS)
- FAO Compliance Agreement
- UN Fish Stocks Agreement (1995)
- FAO Code of Conduct for Responsible Fisheries (CCRF)
- The International Plan of Action for IUU fishing (IPOA-IUU, 2001)
- Port State Measures Agreement
- Southern African Development Community (SADC) Protocol on Fisheries

Tanzania is a full member of the Indian Ocean Tuna Commission.

1.3 MCS Policy

The two components of the URT manage their nearshore fisheries separately. This is as a result of the agreement at Union that Fisheries would not be a Union matter. However, it was recognised that the management and control of the EEZ should be jointly managed, leading to the creation of the Deep Sea Fisheries Authority. The DSFA manages the EEZ beyond the 12 nautical mile limit.

The National Fisheries Sector Policy of 1997 has the following aims:

1. Improved resource management and control;
2. Integration of environmental protection and development;
3. Improved training and education;
4. Improved knowledge of the fisheries resource base;
5. Efficient resource utilization and marketing;
6. Applied and strategic research;
7. Aquaculture development;
8. Community participation;
9. Fisheries information management;
10. Cross-sectorial collaboration
11. Integrated coastal zone management
12. Regional and international co-operation.

In Zanzibar fisheries management and MCS are the responsibility of the Ministry of Livestock and Fisheries Development (MLFD). Practical implementation in the Marine Conservation Areas is largely devolved to the Village Fisheries Committees in co-operation with the MCA staff. The writ of the MLFD is, limited to the territorial waters (12 nautical miles) around the islands of Unguja and Pemba. District officers work in close co-operation with fishing communities.

On the Mainland monitoring, control and surveillance of fisheries is the responsibility of the Fisheries Development Division of the Ministry of Livestock and Fisheries Development. Licencing and MCS are the responsibility of the Fisheries Resource Protection Section (FRP), headed by an Assistant Director. There is a perception among some officials that the Fisheries Development Division is wrongly placed within the Ministry of Livestock, and that a better Ministerial home would be the Ministry of Natural Resources and Tourism, where it was formerly situated.

In practice most MCS functions have been devolved to District Officers in the 16 coastal districts on the mainland and hence to village level Beach Management Units. Although this is an admirable example of co-management, the practical outcome is that MCS is not optimally applied.

As in Zanzibar, the jurisdiction of the FDD is limited to the 12 nautical mile territorial waters.

Management of the EEZ has been devolved to the Deep Sea Fishing Authority in terms of the Deep Sea Fishing Authority Act of 1998, as amended by the Deep Sea Fishing Authority (Amendment) Act of 2007.

MCS is a vital part of fisheries management. The aim of fisheries management should be to ensure the sustainability of the resources as well as limiting the effects of exploitation on the ecosystem. It should be noted, however, that the management plans for four priority fisheries (Tuna; Small and medium pelagics; Prawns and Octopus) do not include MCS plans for these fisheries.

The existence of a focused, coherent and practical MCS plan is a prerequisite for a practical MCS budget. The chronic shortage of funding from the State coffers suggests that MCS planning is not adequate to convince treasury of the need to fund MCS.

1.4 MCS Institutions

Although MCS in Tanzania is primarily the responsibility of the two Fisheries departments and the DSFA, MCS is not a stand-alone function. These organisations depend on assistance and co-operation from a number of other organisations of State and NGOs to carry out their mandate.

These organisations include:

Marine Police

Customs

Tanzania Defence Force (which include the Tanzanian Navy)

Marine Parks & Reserves Unit and its three marine park operations

Zanzibar Maritime Authority

Surface and Maritime Regulatory Authority (SUMATRA. Mainland)

Fisheries Education and Training Authority (FETA)

District Councils

2 Threats to the Tanzanian Marine Environment.

Tanzania has 1424 km of marine coastline, including numerous islands. The continental shelf is generally narrow. The coastline embraces a variety of ecosystems, including coral reef systems, large estuaries, mangroves and muddy shorelines. The coast is influenced by the East African Coastal Current, which in turn is driven by the South Equatorial Current as well as by the SE (May-Sept) and NE (Nov to Feb) seasonal monsoon winds.

The influence of oceanic currents, as well as input of nutrients from the large estuaries along the coast, such as the Rufiji Delta, sustains a varied and productive marine ecosystem. Not surprisingly fish forms a significant part of the protein intake of the coastal peoples, with per capita consumption of fish and fish products averaging 20-30kg per person per year. The intensive use of the coastal region, especially in terms of uncontrolled fishing, urbanisation, mineral exploitation and the associated pollution poses a significant threat to the health of the coastal ecosystem.

The effects of climate change, in particular increases in sea temperature and acidification of the ocean due to a higher level of dissolved carbon dioxide has adverse effects, in particular, on coral reefs.

The coastal resources of Tanzania are easily accessible to the coastal population, thanks to generally benign conditions and waters sheltered by reef systems. This easy accessibility results in the single most significant threat to the marine ecosystem, notably the overexploitation of marine resources.

The inshore fisheries of Tanzania, which make up almost all of the national marine fishing effort, are almost exclusively open access artisanal and subsistence fisheries. The exception is within the Marine Parks, which cover about 1 500 km². In terms of the law fishermen and fishing vessels must be licenced, with approval from the Beach Management Unit. However, the law is not always effectively applied. Although the individual impact of each fisherman is small, the collective impact is large enough to threaten the fish stocks and to pose a serious threat to the marine environment. This is true of uncontrolled open access fisheries around the world, especially where fishing is driven by poverty.

Illegal and destructive fishing methods contribute to the pressure on the ecosystem. Illegal fishing gears, such as beach seine nets, contribute to environmental damage. A more serious threat is the use of explosives as a fishing method. This results in the destruction of sections of coral reef depriving fish of habitat. The destruction of the reef system contributes to further damage of the coastline, in particular erosion of beaches and destruction of mangroves due to wave action that would otherwise have been damped by the reefs.

The uncontrolled targeting of high value species, such as sea cucumber and sharks destroys the balance of the ecosystem. Sea cucumbers have been decimated in just a few years as a result of high demand, and thus prices, in the Far East.

The inshore mixed species fishery is showing increasing signs of stress. Fishermen I spoke to claimed there were noticeable changes in the species composition of catches.

In terms of threats that can be addressed by MCS measures in the short term the priorities are as follows:

1. Destructive fishing practices, in particular dynamite fishing.

2. Unlicensed and uncontrolled open access to the coastal fisheries. Although there is a licensing system it is poorly enforced and not able to restrict fishing effort.
3. Coastal degradation due to pollution and destruction of habitat. An easy to address example is the plastic pollution of mangroves.

2.1 Institutional MCS capacity

MCS has often been called the executive arm of fisheries management. The reason for this is clear. Fisheries management policies and measures cannot be effective unless their application is monitored and enforced in an effective way.

Although there is no formal definition of fisheries management the FAO uses the following summary: *“The integrated process of information gathering, analysis, planning, consultation, decision-making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulations or rules which govern fisheries activities in order to ensure the continued productivity of the resources and the accomplishment of other fisheries objectives.”*

From this summary it can be seen that fisheries management is a complex task that requires not only **an enforcement arm, but also suitable, practical and enforceable legislation and regulations, effective planning, sufficient funding and most importantly, political will** to carry out its mandate. Essential for successful fisheries management is the acceptance by the majority of the coastal population that the laws and regulations are fair, logical and practically implementable.

The two parts of the United Republic of Tanzania, Mainland and Zanzibar, each have their own fisheries legislation. (Zanzibar: Fisheries Act of 2010; Mainland: Fisheries Act of 2003.) Each part of the Union is also responsible for managing its portion of the internal and territorial waters.

The two separate fisheries laws enacted by Tanzania Mainland and Zanzibar are largely similar, but differ in some aspects. As a result some practices that are illegal in one jurisdiction are legal in the other.

Fishermen move freely between the two jurisdictions, although there is a system in place requiring that such fishermen obtain licences from district offices. This system is not always enforced, leading to confusion and misunderstanding, especially among fishermen who do not have a high level of education or an in depth knowledge of the fisheries laws of the two entities.

Fisheries in the United Republic are open access fisheries in practice, if not in terms of the law. Although the law requires that all fishermen and fishing vessels be licensed and registered, the system is poorly applied at District level. There is no effort to limit licences to match the sustainable yield of the resource. To an extent this is because there is no accurate measure of sustainable yield. This requires further research and regular stock assessments in order to arrive at a meaningful and sustainable level of fishing effort.

There are limits on the use of certain destructive fishing methods, in particular the use of explosives and chemicals, beach seine nets and spear guns. Despite this, these methods are used, often with impunity.

2.1.1 Tanzania Mainland

The main focus of fisheries management in Tanzania Mainland is the freshwater fisheries on the Great Lakes, in particular lake Victoria and Lake Tanganyika. These

fisheries account for the bulk of the catch and of exports of fish and fish products. Coastal fisheries are mainly the preserve of artisanal and subsistence fishermen who take around 99% of the catch.

The actual Fisheries Resource Protection Section in Mainland Tanzania is a very small entity, which has to cover the entire coastline. In addition, many of these officers have administrative duties that take up a major part of their time.

The officials who are responsible for fisheries management in the Districts often have other responsibilities and are thus not exclusively concerned with fisheries. This dilutes the effort that they can put into what is sometimes considered to be a minor function of their work. The district officials are also likely to be less well trained than the Fisheries Officers employed by the FRPS, who have generally benefited both from formal training at university or other institutions such as the Mbegani Fisheries Development Centre, as well as from more practical training courses offered by projects such as the SADC MCS Programme, Smartfish, MACEMP and others.

2.1.2 Zanzibar In Zanzibar (Unguja and Pemba) the tradition of fishing is much older, as is usual in island communities and is a much more important and established part of local culture and economy.

The Ministry of Livestock and Fisheries Development in Zanzibar employs thirty Fisheries Officers. However, there is a consensus among fisheries officers interviewed that double that number of Officers are needed to ensure adequate enforcement.

2.1.3 Deep Sea Fishing Authority. Management and control of the EEZ has been devolved to an semi-autonomous agency, the Deep Sea Fishing Authority, (DSFA: Deep Sea Fishing Authority Act of 1998, as amended by the Deep Sea Fishing Authority (Amendment) Act of 2007) which is responsible for licensing vessels to fish in the EEZ, mainly for tuna and tunalike species, and to ensure compliance with both Tanzanian legislation and the requirements of the Indian Ocean Tuna Commission, of which Tanzania is a full member.

3 The status of MCS in Tanzania

MCS is burdened by serious challenges. These were identified by a workshop for Senior Managers organised by SMARTFISH in 2012 as the following:

- 1. Fundamentally open access nature of fishery hampers any effective MCS, no database of fishers and fishing vessels exists*
- 2. BMU's not achieving objectives*
- 3. No effective national data strategy for monitoring of fishery sectors*
- 4. Lack of buy in at senior political level for importance of fisheries in Tanzania*
- 5. Policy and legislation require updating.*
- 6. Lack of specific MCS strategic plans in fisheries management plans*
- 7. Lack of economic and social information on the different fishery sectors to guide and inform MCS strategy*
- 8. Judiciary and MCS officers often not trained in dealing with fisheries offences*

3.1 MCS Challenges

The above points succinctly summarise the challenges facing effective MCS in Tanzania. A further challenge is the lack of sufficient funding for MCS activities and a lack of MCS management capacity within the management organisations. This is particularly true in the area of developing strategies and budgets for MCS operations, such as the operation of patrol vessels.

Some of the fundamentals are in place. Previous programmes, such as MACEMP, have provided many of the material needs required for effective MCS. This includes vehicles, patrol boats and computers. Although some of these assets are not fit for purpose, such as a vessel based at Mafia Island that was designed for inland waters and is not usable at sea and several high-powered patrol boats that are too expensive to operate on a sustained basis, there is a foundation of equipment to build on.

3.1.1 Mainland

The main thrust of MCS efforts in Mainland Tanzania is focused on the inland fisheries of the Great lakes region. This is understandable, as this represents the greatest value fishery and is the biggest contributor to fish exports. The socio-economic importance of inland the fishery is illustrated by the employment of about 80 000 fishermen, plus many thousands of others who are indirectly reliant on fishing. Fishing has, for many young men, become the employment of last resort.

The result of this is that there is relatively little effort and funding allocated to the coastal fisheries. Mainland Tanzania has only eleven Fisheries Officers working on marine fisheries. Most MCS functions are devolved to District Officers and BMU's.

In order to make the most of limited resources Officers need training in risk assessment in order to allow them to plan their operations in a cost effective and efficient manner, targeting areas of greatest risk and optimising the use of scarce resources and funds.

One important area of training that has been neglected is in the field of investigation, evidence gathering and prosecution. The level of successful prosecutions is very low, and where these are successful penalties are often so low as to be insignificant. This is partially as a result of the level of penalties provided for in the law, and because of a seemingly widely held perception that fisheries offences, even ones as serious as dynamite fishing, are not a very serious matter. This can only be rectified if the officers prosecuting the cases as well as the magistrates presiding over the cases have a very thorough knowledge of the law and have the evidence and facts to back up their case. As fisheries cases are specialised cases requiring a thorough knowledge of both the law and the technical aspects of the fisheries case it is important that there are specialist fisheries prosecutors to present these cases and ensure that convictions are procured and sentences are commensurate with the seriousness of the crime.

The issue of corruption was often raised. I could not find any direct evidence of this, but it seems likely that there is some basis to the allegations.

3.1.2 Zanzibar

Fishing is a much more established part of the culture and tradition of Zanzibar. This is understandable, as the economy of the islands is much more closely tied to the sea. What this does mean is that the seas around the islands sustain more fishing pressure than the Mainland coast.

In Zanzibar there are 30 Fisheries Officers in service. However, compliance officers estimate that 60 Fisheries Officers would be required for effective MCS in Zanzibar. The level of training is similar to that of mainland Officers.

As on the mainland, many functions associated with MCS and fisheries management have been devolved to communities in the form of Village Fisheries Committees, in particular in the Marine conservation Areas. Although these committees appear to be well constituted and established, they seem to have only limited power to combat illegal fishing, especially by fishers from outside their own communities.

The requirement for training in investigation and evidence gathering is similar to that of the Mainland.

3.1.3 Deep Sea Fishing Authority

The DSFA is a relatively new organisation that is still in the process of establishing itself. The present staff complement is very small, totalling only about six technical staff, including the Director General and Deputy Director General. Although more staff have been approved and are being recruited, the numbers are still not deemed adequate.

The management and control of the EEZ has been devolved to the DSFA. This appears to have been largely successful in terms of licencing of foreign vessels fishing for tuna and tunalike species, as well as encouraging flagging some fishing vessels in Tanzania. This is important for Tanzania as it establishes a record of fishing for these species that will be useful in the future when it comes to allocating quotas for tuna in the Indian Ocean. There have, however been instances of known IUU vessels being (albeit temporarily) flagged due to lack of capacity for checking the vessel data. The verification system has since been improved.

At present the system allows only for the licencing of fishing vessels at a fixed fee. There is no attempt to allocate a quantum of catch or to charge a royalty on fish caught. Although this would be difficult, as catches are not landed in Tanzania, it would be possible if entry/exit reports and catch data monitored in the landing ports are used. The introduction of a fee plus royalty system should be considered for the future, as it will generate more of the revenue needed to effectively manage the EEZ. Managing EEZ fisheries is an expensive exercise, due mainly to the high costs of patrolling a vast area. Licence fees amount to about one million US dollars per year. At present the DSFA retains 50% of the licence fees to finance its operations, a sum not sufficient for effective surveillance operations that include sea and air patrols. Effective surveillance at sea, using both aircraft and ships, is expensive, costing thousands of dollars per day. The estimated cost of effective coverage by sea and air patrols is in the region of half a million US dollars per year, leaving little or no money for the other costs of

A system requiring pre-fishing inspections for vessels applying for licences to fish in Tanzanian waters has been introduced. The first vessels were inspected by DSFA inspectors in ports outside Tanzania. This requirement is being expanded to require a percentage of vessels to come into port for pre-fishing inspections prior to being granted licences. Vessels are inspected to ascertain that they have legal documentation and approved fishing gear.

Fishing vessels visiting Tanzanian ports bring substantial additional economic benefits when buying supplies, fuel and other goods and services.

The DSFA's ability to actively enforce Tanzanian legislation is severely limited due to a lack of resources. The VMS system gives continuous positions of licenced vessels while they are in the EEZ. Limited air patrols are conducted as funds permit. These patrols allow for the detection of illegal vessels that do not have VMS on board. Air patrols have in the past been very valuable in detecting illegal vessels and have resulted in increased income from licencing once a patrol presence and thus the danger of detection had been established. This was illustrated during the SADC/EU MCS project in 2004, when a one off air patrol found more than twenty large purse seiners fishing illegally in Tanzanian waters. Most of these vessels subsequently applied for licences.

Air patrols are limited to sighting and identifying the vessels. Inspection of vessels to ascertain their adherence to catch and gear limitations can only be done at sea. Air patrols are themselves expensive, but have the advantage of being able to cover large areas in a short period of time and additionally are discrete, in that the vessels being observed are usually unaware of the presence of an aircraft. Sea patrols are capable of much closer inspection and investigation, but patrol vessels are much slower and can cover less area in a given time. The presence of a patrol vessel is soon transmitted to other vessels in the area, allowing illegal vessels to leave the area. Sea patrols therefor need to be targeted using available intelligence and knowledge of the location of vessels of interest. A combination of air and sea patrols, together with other surveillance methods gives the best coverage and cost efficient use of patrol assets.

Tanzania does not have a suitable fisheries patrol vessel and it is probably uneconomical to acquire one. Given the shortage of resources the use of chartered and shared vessels is the best avenue to obtain a sea patrol capability. There is a history of such co-operative patrols, the most striking being the patrol of the South African owned vessel the *Sarah Baartman*, which resulted in the apprehension and prosecution of the *Tawariq 1*.

There are already discussions with Mozambique about using the Mozambican patrol vessel *Antillas Reefer*. This type of asset sharing is encouraged by the SADC Protocol on Fisheries, of which Tanzania is a signatory.

In the near future a regional patrol, under the auspices of the Indian Ocean Commission using the chartered vessel *Maya's Dugong* will provide a patrol platform for Tanzanian waters.

Apart from regional organisations such as the IOC and the IOTC, DSFA participates in an informal regional information sharing organisation known as FISH-i Africa, a network of fisheries professionals working in the Western Indian Ocean.

Policing an area as large as the EEZ presents a very different challenge to that of policing the territorial waters. The vessels being monitored are almost exclusively foreign owned and flagged, and many of them never call at a Tanzanian port. Surveillance is necessarily expensive and requires a high level of technology.

Licensed vessels are monitored by means of a Vessel Monitoring System that reports data such as position, course and speed of vessels at selected intervals. There is a system of daily reporting, where vessels have to report their position and catch for the previous 24 hours to the DSFA, as well as an entry/exit report requirement.

DSFA does not have sufficient trained VMS operators to use the system effectively on a 24-hour per day, seven days per week basis.

VMS can, however, only keep track of licensed vessels. The movement of other vessels is more difficult. DSFA has joined an information-sharing network that allows neighbouring countries to share data such as licence lists and information on the movement of vessels. Although such systems help to keep track of vessels, there is still a need for regular physical patrols of the EEZ.

3.2 Fisheries policy and law.

Although the Fisheries laws of both Mainland Tanzania and Zanzibar are relatively new, there are weaknesses in these laws that make enforcement difficult. Mainland Tanzania is in the process of revising its fisheries law and it is hoped that the new law will remedy some of these weaknesses.

Legal matters will be addressed by a separate consultant, but from an MCS point of view it is important to note that accurate definitions and accurate descriptions of activities are vital for successful prosecution of offences. This applies in particular to things like definitions of fishing gear and operations. It is equally important that laws are practically enforceable.

In many cases the people convicted of fisheries crimes are only the 'foot soldiers,' while the real criminals, the ones dealing in the illegal products, get away scot free with their profits intact. Pursuing the organisers behind what is essentially organised crime may require changes in the respective Fisheries Laws and quite possibly other laws to enable the prosecution of such people.

This is especially true in the case of dynamite fishing. This is a highly organised type of fisheries crime. Explosives have to be procured, whether bought, stolen or manufactured. The fishermen who use the explosives need a market in which to sell their fish, much of which is identifiable as fish killed by explosives while in the fresh state. There is believed to be a channel that markets this fish to buyers within Tanzania, regionally, and possibly even further afield.

The following is a quote from an informant. Understandably people are reluctant to be identified.

“The general views in Tanga are that this is not done for local consumption and subsistence, but organised by well-connected people who own the boats, employ the fishers, provide the explosives and collect the blasted fish from villages, where they are stored in freezer boxes with ice blocks and then taken up-country.

Research is difficult and even dangerous, one Patrol officer who took his job serious got acid thrown at his face 2 years back.”

If this practice is to be stopped, these traders must be prosecuted and convicted together with the fishermen who actually use the explosives.

Management plans have been developed for a number of priority fisheries. These include Octopus, Small and Medium Pelagics, Prawns and Tuna. Although level of implementation of these plans is minimal, one or more of these fisheries can and should be used as pilot projects for a focused and comprehensive licencing system, with a view to establishing the amount of fishing effort that each of these can sustain. The relatively contained focus of these fisheries will help to perfect systems and procedures and eventually allow for the licencing system to be applied to other fisheries, in particular the ubiquitous multi-species inshore reef fishery that is the staple of the artisanal and subsistence fishermen.

All of these priority fisheries have a commercial aspect, and their products are sold to external markets. Given that some of these markets, such as the European Union, have strict certification requirements to ensure that fish and fish products imported into their region have been caught in accordance with national laws, it is important to have a suitable mechanism for certification of the fisheries, such as prawns and octopus, which are exported.

A formal and functional licencing system, together with the concomitant keeping of accurate catch records is a basic requirement for this type of certification. Although shipments destined for the European Union are certified by the fisheries authorities, there may in future be questions about the reliability of this certification in the absence of fully effective MCS.

3.3 Co-Management.

Much of both fisheries management and the related MCS function has been devolved to local level, administered by District Officers and in particular by Village Fishing Committees in Zanzibar and Beach Management Units on the Mainland.

This is a good example of co-management between government and communities and has potential for effective management of the local fisheries. However, the system has not yet been fully

implemented, due to a number of factors including insufficient training of BMUs and VFCs, insufficient funding, local loyalties and political considerations at local and national level.

The result is that illegal fishing is widespread in Tanzania. This was made very clear by fishermen interviewed during the mission. These interviews were done on a formal basis with representatives of fishing communities, as well as impromptu interviews with individual fishermen along the coast. Some of the revelations were startling!

Clearly there is little effective MCS in Tanzania, in particular when it comes to subsistence and artisanal fishing. Catch records are poor, the use of illegal gear is widespread, and there is a general attitude that the probability of apprehension and prosecution is insignificant.

It is interesting to note the different perceptions regarding the amount of illegal fishing. Senior managers in Zanzibar estimated the level of illegal fishing at around 20%. Middle and field level fisheries officers gave estimates ranging from 30% to 50%. The fishermen themselves gave much higher estimates. Representatives of the fishing communities in the Menai Bay Conservation Area (MBCA) in Zanzibar were of the opinion that 70 – 80% of fishing in their area was illegal in some way. Much of the illegality was attributed to fishermen fishing outside their areas or using illegal fishing gear. It was also agreed that most of this was attributable to local fishermen, rather than to outsiders coming into the boundaries of the conservation area.

Although much of this illegality can be attributed to poor implementation of the licencing policy for fishermen and fishing vessels, there is blatant and widespread use of illegal and destructive fishing methods.

A fisherman who openly admitted that he used an illegal spear gun to catch reef fish and lobster said, “it is only illegal if you are caught, and there is little chance of that.”

Pemba villagers disagreed on how many turtles they speared every year, but agreed that the number was between 30 and 60. **This is not the only village where the hunting of turtles appears to be a normal practice.** On the Mainland I was told the correct way of slaughtering turtles that are accidentally caught in nets to ensure that the meat is halaal. The fishermen denied that they targeted turtles, but were adamant that any that were caught alive would be slaughtered for food. The shells are mainly discarded as being too incriminating, although this is not always the case, as I was offered a turtle shell as a souvenir in Stone Town.

3.4 Licencing System

The system of registering and licensing fishermen and fishing vessels appears not to be effective. The system is applied only patchily and does not give the requisite information on the amount of fishing effort. Such information as there is, is gathered from periodic frame surveys of the number of fishing vessels.

The licencing system should be improved and enforced to allow an accurate measure of the number of vessels and fishermen using the resources. At the same time assessments of the carrying capacity of the resources should establish the amount of effort each of the fisheries can withstand. The effort should then be controlled at a suitable level by limiting the number of licences issued. Although there is a perception that the impact of each individual subsistence or artisanal fisherman is tiny, the

collective impact of many thousands of such fishermen is substantial enough to threaten the sustainability of the fisheries.

Managing and policing small-scale fisheries is a difficult and complex task, especially in comparison to large-scale commercial fisheries. Socio-economic factors play a much more important role in the management of these fisheries, hence the importance of community buy in and effective co-management.

As a result of the sheer volume and long term unsustainability of intensive small-scale fishing, it is only a matter of time before there will have to be a limitation on the amount of fishing effort licenced and authorised. The first step toward this is to have an efficient licencing system that captures the true quantity of fishermen and vessels together with the volume of fishing effort. The demise of the open access system has been foreseen in legislation, as the Fisheries Act of 2003 on the Mainland makes provision for the limitation of fishing licences.

The licencing of foreign vessels fishing in the EEZ has been devolved to the DSFA. The system appears to be working well, despite initial teething troubles.

3.5 Planning and budgeting

This would appear to be one of the greatest challenges facing effective MCS. There is a shortage of funding for MCS operations, as can be seen by the lack of funding available for the running of the inshore patrol vessels.

This is partly due to a general lack of funding available and a low priority for fisheries in general and MCS in particular, especially in Mainland Tanzania. However, at least some of the problem is attributable to a lack of MCS planning and accurate and well-motivated budgets.

The inshore patrol boats operated by the mainland are a case in point. Although there are 18 inshore patrol boats available to the Fisheries Division, according to the officer in charge of the fleet **none of them are operational due to a lack of funds for maintenance and operating costs**. Ironically there is a newly published tender for four more boats! When discussing this with Capt. Mapanda who is in charge of the patrol vessels I was informed that there was no sufficient budget for running the vessels, it was also clear that there was no co-ordinated plan for using them and little detailed knowledge of the costs involved.

This highlights the need for detailed planning and budgets for MCS activities.

Management plans have been developed for several priority fisheries, mainly ones that have potential for export. These include:

- Tuna and tuna-like species (Mainly in the EEZ, although there is a small inshore fishery)
- Small and medium pelagic fish
- Prawns
- Octopus

All these fisheries, with the exception of tuna in the EEZ, are quite small, species focused fisheries. They can thus be used as pilot fisheries for the development of a more comprehensive fisheries management system, including effective effort control through licencing and the establishment of a system of total allowable catches, or, perhaps more realistically, total allowable effort. However, it is notable that these plans do not include MCS plans for these fisheries.

3.6 Destructive Fishing Methods.

Destructive fishing methods are a particular concern due to the long-term environmental damage involved. These methods include fishing with explosives (dynamite fishing), the use of beach seine nets, indiscriminate spearfishing and the use of ringnets and purse seine nets in shallow water over seagrass beds and coral reefs.

3.6.1 Beach seine nets

The use of beach seine nets is outlawed in Tanzania as a destructive fishing method. Beach seine nets, indeed any net that is in contact with the sea bottom, have the potential to do significant damage to sensitive areas such as coral reefs and seagrass beds. However, the use of beach seine nets is widespread and blatant. (While writing this I was watching a beach seine being used near Bagamoyo). At low and half-tide many seine nets can be seen in operation along the beaches. There appears to be no attempt to enforce the ban on these nets except to some extent within marine parks, though not very effectively.

A law that is not enforced damages respect for the law, leading to other abuses. It is clear that beach seine fishing is tolerated by both the community and local authorities. It would thus make sense to review the blanket ban on the use of this gear.

One possibility is to determine which areas are suitable for the use of these nets, define these areas and allow the use of the nets in these approved areas, while strictly enforcing the ban outside these areas.

‘Safe’ areas for the use of the nets can be identified as part of a larger zoning exercise to identify fishing areas for various uses. Identification of ‘safe’ areas should be done using a combination of scientific data and input from the local fishing communities. Nets licenced for use in an authorised area should be inspected and tagged with permanent metal tags to ensure compliance. Catch and effort data must be collected for these nets in order to evaluate the catch and detect any negative effects of this fishing method.

The use of beach seine nets should be monitored by trained beach recorders, who will collect catch and effort data on an ongoing and structured basis.

3.6.2 Spearfishing

Methods such as spearfishing (Spear guns, Hawaiian slings, etc.) target vulnerable species, especially in coral reef areas where fish are easy prey for a spearfisherman. Widespread and intensive spearfishing has the potential to permanently and irreparably change the species composition of reefs by selectively removing large and easily killed species such as groupers, large wrasse, parrotfish, snappers, and small sharks. Speared fish are easy to identify as such if landed whole, yet these are sold in the fish markets without sanction.

There is a case to be made for selective spearfishing licences to be sold to tourists who want to spearfish for large pelagic fish, such as tuna and billfish by free-diving (i.e. not SCUBA). This would

be a good revenue earner and would have little impact on the stocks or the environment, as this type of fishing occurs far offshore and very few fish are actually taken.

3.6.3 Dynamite Fishing

A much more destructive and dangerous method is fishing with the use of explosives. ‘Fishermen’ use both home made explosives, using ingredients easily available at retail stores, and commercial explosives stolen or otherwise acquired from mining and civil engineering sources.

Dynamite fishing is not merely a fisheries crime. It is organised crime that poses threats far beyond the realm of fisheries. It is a particular concern that the hotspots for dynamite fishing are also areas where there are major ports (Dar es Salaam, Tanga) or in areas where oil and gas have been found and are being extracted.

Explosives used for fishing can as easily be used for sabotage or other criminal activities!

The use of explosives in coral reef areas not only kills fish, of which probably less than half are actually recovered, but destroys significant areas of coral habitat, thus creating a desert where fish cannot survive. Coral reefs are slow growing structures, which can be destroyed in seconds by explosives.

There are wider impacts on the environment. The destruction of the reefs removes the protection the reefs provide to the coastline, resulting in beach erosion and the destruction of other coastal environments such as mangroves.

The easy availability of explosives has risks beyond the realm of fisheries. Explosives used in fisheries crime can as easily be used in other forms of crime. This includes the risk of sabotage and terrorism. Combatting dynamite fishing is thus an endeavour that goes much wider than fisheries, and should include the police and security forces to investigate, arrest and prosecute both the fishermen and more importantly, the organisers behind this type of organised crime.

The dynamite fishermen appear to operate with impunity in areas such as Tanga, Mtwara and even Dar es Salaam where explosions are regularly heard during low spring tides. Most of this activity takes place during daylight. The identities of dynamite fishers are common knowledge, as is the location of the clearinghouse for the illegally caught fish.

The incidence of dynamite fishing has fluctuated over the last decades. For one period in particular from 1997 to 2002, when there were regular patrols, or special operations, the incidence went down. At other times, such as the present, where the availability of fuel for patrol vessels is severely limited, it is widespread and blatant.

Although patrols inhibit the dynamite fishermen, the fishermen have the support of at least some of the local community, which alerts them to the presence of patrols. This was asserted by both local residents and the patrol officers from the Tanga Marine Park. The patrols can only have a deterrent effect. Elimination of the crime requires integrated law enforcement measures, including routine patrols targeting high-risk areas and times, undercover patrols and investigation into the organisation behind the trade. It appears that the buyers, the routes they use to move the fish, and the eventual end users of the product are known, yet there is has been no action taken due to the lack of hard evidence.

Informers are reluctant to come forward as a result of intimidatory acts such as the acid attack on a Fisheries Officer.

The impact of this practice goes beyond just fishing. Tourism is an important part of the economy of Tanzania. Tourists are fickle creatures and easily decide to avoid areas and countries they see as dangerous. Recent activities by terrorists and pirates have already frightened off many tourists and tour operators.

There is a very real danger of a tourist being seriously injured or killed as a result of dynamite fishing. There are recorded instances of explosives set off in the close vicinity of divers in the Tanga area. The reports state that the 'fishermen' were well aware of the presence of the diver but that they believe the explosions will not harm humans. This despite the fact that several 'fishermen' have lost limbs in accidental blasts.

Quote from resort operator just outside Tanga. *“Every single year our diving friends from Germany experience blasts right next to where they are in the water causing distress, ringing ears etc. Some other friends were so frightened that they wont even contemplate diving in this area again as they were badly buffeted.”*

Should a tourist be killed, the damage to the tourism industry in Tanzania and the region could be very serious indeed. It is important to note that this impact will not be restricted to coastal areas, but will include the main revenue earners such as the Serengeti and Mount Kilimanjaro.

Eliminating this practice requires a multi-pronged approach. The presence of both land and sea patrols targeting high risk areas will inhibit the use of explosives. However, the buyers and backers must be found and prosecuted. This requires fisheries officers trained to investigate crime, as well as legislation that allows the prosecution of those who receive, transport or deal in illegally caught fish. Penalties should be heavy enough to serve as a serious deterrent. In many cases the penalties imposed in the rare cases where there is a prosecution are so light that they are no more than a minor business expense.

4 MCS priorities

The issue of prioritising MCS issues is prone to interpretation. What must be borne in mind is that the ultimate purpose of MCS, as with all fisheries management measures, is to ensure the long-term sustainability of the fisheries resources and coastal ecosystems of Tanzania.

In the light of the above the priorities are the following:

4.1 Long term fisheries policy

To develop a long-term fisheries policy that takes into account the finite nature of the marine resource and the importance of sustainable exploitation of the resource for the benefit of coming generations.

From this basic premise the following actions follow:

4.2 Legal Review

Revise the fisheries laws of Tanzania Mainland and Zanzibar to ensure that the principle above is enshrined in the legislation. The laws of the two entities must be harmonised to the greatest extent possible in order to promote a uniform approach to fisheries management.

4.3 Recognise the inevitability of an end to the open access fishery.

The political difficulty of this step is acknowledged. However, it is a vital step for the continued wellbeing of the resource and the coastal economy.

The first step is to create an effective and comprehensive system of registering and licencing fishermen and fishing vessels and to determine the amount of fishing effort that is sustainable. This is a major undertaking, as it will have to be accompanied by a public education programme to inform the public of the reasons for this step. Such a campaign will not be without difficulties, of which cost is just one aspect.

The present licences are paper documents that are near impossible for fishermen to carry with them while they are fishing. These should be replaced by a credit card sized document carrying a photograph that is waterproof. These licences may be issued with a validity of several years, subject to annual renewal by payment of a fee.

Enforcement of the licence system must be carried out on an ongoing basis by fisheries officers, marine police, district officers and BMU/VFCs.

4.4 Eradicate destructive fishing methods

Dynamite fishing is the first priority in this category. This is because dynamite fishing not only poses a threat to sustainable fishing due to the wholesale destruction of the marine habitat, but also poses serious threats to life and to the Tanzanian economy as a whole.

The campaign against dynamite fishing must be multi-faceted.

- Extensive public education campaigns must be initiated or revived.
- Targeted, planned patrols both on land and at sea must be done to prevent dynamite fishing by the presence of law enforcement personnel at times and places where the fishing takes place. This has been successful in the past during 1997-2002, when Naval and Police patrols, together with patrols by fisheries officers drastically reduced the incidence of dynamite fishing. The end in 2002 of a policy of deploying Naval personnel in forward coastal stations has seen a sharp resurgence in dynamite fishing.

It must be stressed, however, that the campaign against dynamite fishing must not rely solely on donor funding. **There has to be sustained and sufficient budgetary support for this activity.**

- The supply chain of both the explosives and the fish must be thoroughly investigated with a view to stopping the supply of explosives and the trade in the illegally caught fish. The major beneficiaries of this trade are likely to be people other than the fishermen. From the experience of other large scale illegal fisheries, such as the abalone fishery in South Africa, the people behind the trade are very likely to be involved in other illegal activities, such as drugs, ivory poaching and smuggling.
- Sensitize prosecutors and the judiciary to the seriousness of the offence. It appears that at present very light sentences are handed down in the cases where fishermen are convicted. Prosecutors and investigators must be trained in effective investigation techniques and in the preparation and prosecution of fisheries cases.

4.5 Strengthen the co-management system by means of improved training and funding of BMU/VFCs.

There is limited reliable data on catches and landings by artisanal and subsistence fishermen in the coastal areas, although there are areas, such as the Rufiji delta, where NGOs have assisted in improving the quality of this data. Collection of such data is difficult as a result of the open coastline and the dispersed nature of landing sites. BMUs and in particular beach monitors have the responsibility of collecting catch and effort data. The quality of this data is patchy, due to a lack of suitably trained beach monitors, the voluntary nature of their work, and a lack of data validation.

Thus, although the statistical systems used to evaluate the data are robust, the poor quality of the input into these systems renders the output suspect. The fisheries data system and the quality of that data have been addressed in a separate report.

An improved system of collecting data, including training and preferably remuneration for the beach recorders, as well as a system of validating data by means of spot checks should be introduced in order to improve the quality of data fed into the system.

Beach recorders collect basic catch and effort data that is submitted to the Fisheries authorities. This is the main source of statistical data on catch and effort apart from Frame surveys. The data derived from the beach recorders is lacking in quality, for several reasons.

There is little feedback to communities as a result of this data collection apart from aggregated data presented as part of departmental reports. If the beach recorder does a measure of basic analysis of the data and makes that available to the community in near real time it is likely that there will be a greater interest in ensuring that the data collected is accurate. An added advantage is that the community will be able to see trends in their own performance and may, therefore, be more amenable to changes or the imposition of control measures.

5 Proposed MCS related projects for the first phase of SWIOFish

Tanzania has the basic elements required to successfully manage its marine living resources. The constraints are mainly due to lack of resources, insufficient training and lack of motivation. Many of these problems can be remedied at minor cost in money, although there is a need for time, energy and commitment.

Tanzania is fortunate in having a very good training facility at Mbegani, one capable of offering courses in many of the fields required. There is equally good expertise within the staff of the college. Regionally there are experienced instructors who can be contracted to present courses and all levels.

Standard Operating Procedures are essentially checklists that can be used to ensure that things are done correctly. A very comprehensive set of SOPs, covering inspections, sea and air patrols was developed in the early 2000's these are still valid, although probably in need of revision, but appear not to be used.

Similarly, most of the inspectors have received extensive training, yet there appears to be a lack of motivation to apply their knowledge.

During my visit and subsequently, much was said about the accountability of the fisheries officers and their lack of effectiveness. Morale plays an important part in the efficiency of officers. Basic facilities such as proper and identifiable uniforms would help to create pride in their position and in their work. In the same way that a smartly uniformed policeman inspires confidence and respect, so would a smart fisheries officer. The performance of the officers in the field is a function of effective supervision and involvement by their superiors. Similarly the work of the BMU's and Beach Recorders would be more effective given better supervision and feedback to the people on the ground.

The senior staff of an organisation such as the FDD are often overworked and required to do work not strictly related to fisheries. This impacts on their ability to provide the level of leadership and supervision required to build morale.

An example of the effect of management involvement can be drawn from the former Natal Parks Board in South Africa.

- All officers, from field rangers to the director, wore the same uniform.
- Senior officers, such as the officers in charge of the two coastal districts, made a point of walking patrols with the rangers at least twice a month. Their participation was usually unannounced. They simply arrived at dawn and joined the men on patrol.
- Managers were almost exclusively drawn from the ranks, thus had first hand experience of operational conditions.

Similar involvement by senior staff would do much to improve morale and effectiveness, although it would place a heavy load on the shoulders of management.

The following recommendations will serve to improve systems and training. However, without strong leadership and motivation they are unlikely to be effective in the long term.

5.1 Take concrete measures to improve licencing and registration of fishermen and fishing vessels.

Licencing of fishermen and fishing vessels is a vital basic step in controlling fisheries. The system of licencing in the mainland has been devolved to District Officers, with the exception of vessels longer than 11m in nearshore waters which are licensed by Fisheries Division HQ, and foreign vessels fishing in the EEZ, which are licenced by the DSFA. The system is not effective and it is likely that a significant proportion of fishermen and vessels fishing in coastal waters are not licenced or registered. Interviews with fisheries officials and fishermen suggest that as many as 50% of boats and fishermen may be unlicensed. Estimates of fishing effort are thus based on frame surveys done every few years.

It is proposed that a pilot project be launched based on the priority fisheries mentioned above, for which management plans have already been developed (octopus, small and medium pelagic fish and prawns) as the next step in the effective management of those fisheries. The licencing system employed by the DSFA appears to be functioning well, despite initial teething problems.

All licenced vessels should be clearly marked and identifiable. Vehicle number plates are weather proof, cheap and can be read from a distance. They would make ideal ID plates for even the smallest vessels.

The present paper licences for fishermen are impractical for them to carry with them. A weather proof credit card type licence, while more expensive, would allow fishermen to carry their licences at all times and greatly simplify the task of determining who is licenced at the inspection site.

The general inshore fishery is the most complex and difficult to manage given the complexity of the fishery (some 600 species) and the socio-economic and socio-political implications of limiting access to this resource. Using the more specific fisheries as a pilot will enable the authorities to develop systems and expertise that can be used at a later stage in the sustainable management of this fishery.

Access to the priority fisheries should be limited to licenced fishermen only, with strict and enforceable licence conditions applied to participants. Entry into these fisheries should also be limited to the number of fishermen able to sustainably exploit the fishery and catch and effort records must be kept accurately. It is accepted that this will be a complex task, requiring research into the carrying capacity of the stocks and the socio-economic impact of limiting fishing effort, and thus access to the fishery.

Action steps:

- Launch a campaign in districts to ensure that all fishermen are registered and licenced.
 - Issue licenced fishermen with a weather-proof card that must be carried at all times while fishing, selling or transporting fish.
 - BMU's and district officers to be used to routinely check that fishermen are indeed licenced. The penalties need not be draconian, but significant enough to discourage unlicensed fishing.
- Ensure that all local boats are licenced.
 - Licenced boats to be clearly marked with a licence number. Car number plates are cheap, easy to make and easy to read.
 - Inspections of catches at landing sites must include checking on the licences.

- Investigate mechanisms of using a fixed portion of licence fees to fund district offices and BMUs. The emphasis being that the funding **must** be ring-fenced for MCS and fisheries management use. This should act as an incentive to ensure that licencing is comprehensive.

5.2 Improve systems of monitoring catch and fishing effort by artisanal and subsistence fishermen.

There is little reliable data on catches and landings by artisanal and subsistence fishermen in the coastal areas. Collection of such data is difficult as a result of the open coastline and the dispersed nature of landing sites. BMUs and in particular beach monitors have the responsibility of collecting catch and effort data. The quality of this data is patchy, due to a lack of suitably trained beach monitors, the voluntary nature of their work, and a lack of data validation.

Thus, although the statistical systems used to evaluate the data are robust, the poor quality of the input into these systems renders the output suspect.

There is little feedback to communities as a result of this data collection apart from aggregated data presented as part of departmental reports. If the beach recorder does a measure of basic analysis of the data and makes that available to the community in near real time it is likely that there will be a greater interest in ensuring that the data collected is accurate. An added advantage is that the community will be able to see trends in their own performance and may, therefore, be more amenable to changes or the imposition of control measures.

The effectively voluntary nature of the beach recorders is problematic. They should be paid for their work, thus making them accountable for the quality produced. This would help to create a professional ethic among the beach recorders. Clearly it would also require that sufficient funding be made available to pay salaries. This revenue could be derived from licence fees and, possibly, a small levy on catches.

A system of mentors for BMUs is suggested. Each mentor should be appointed initially to one BMU, expanding their coverage as that BMU achieves a satisfactory standard of performance, but remaining available to advise and assist the BMU. The eventual goal is to have a mentor responsible for several BMUs, for instance those in one or more districts. The mentors would provide on the job training, guidance and education in the work to be done by the BMU. Mentors could either be members of the community, perhaps experienced fishermen, who have been given specific training that they will pass on. The Fisheries Development Centre at Mbegani would be ideal for providing such training. Alternatively they could be university or college graduates with a fishing background. The former option is probably the better one, as fishermen are more likely to take advice from their peers.

Funding for the payment of Beach Monitors and the functioning of BMUs should be derived from a percentage of licence revenues, and possibly small levies on landings, collected by each BMU. This will act as an incentive to ensure that all fishermen are licenced as well as providing a budgetable amount for the expenses of the units.

An improved system of collecting data, including training and preferably remuneration for the beach recorders, as well as a system of validating data by means of spot checks should be introduced in order to improve the quality of data fed into the system. To expedite this a simple but complete logbook should be designed that can be kept by the beach recorders (given the limitations on literacy

among the fishermen). This would serve to establish the concept of keeping logbooks for each vessel and enable the data to be tied to individual vessels and fishermen. Feedback to the fishermen would be made easier and it is hoped would lead to greater individual responsibility by both fishermen and recorders.

Action Steps:

- Beach recorders to be trained in collecting catch and effort data.
- Standardised methods developed and captured in Standard Operating Procedures. These would include methods of measuring the catch, standard groups of species and a standard measure of effort. The latter would depend on the type of fish targeted, and gear used.
- The beach recorders should be given a target of vessels to be monitored on a daily basis. The actual number to be calculated depending on practicality and the number of vessels in the particular jurisdiction.
- Pre-printed log sheets will contribute to consistency of record keeping.
- Information and education sessions, as well as illustrative posters to be used to get the message across to the fishermen, indicating the reasons for the data collection and the benefits that will accrue in the long term.
- Completed log sheets to be checked by a supervisor. These checks must include basic analysis of the data collected (easily done using Excel, if computers are available) to ensure that the data is relatively accurate. The supervisor (District Officer or senior BMU member, perhaps assisted by the mentor proposed above) should be able to use his local knowledge to establish whether the data is reasonably accurate.
- Basic processing of data to be done in the district and fed back to the fishermen on a regular basis, at least monthly, in order to ensure buy in from them.
- Data to be forwarded to FDD for integration with other data and analysis leading to comprehensive data on catch and effort and subsequent calculation of sustainable levels of catch and effort.

5.3 Beach Seine fishing

The use of beach seines is illegal. This is for very good ecological reasons, but only in certain vulnerable habitats, such as coral reefs. However, the law is almost universally ignored, with the result that beach seines are a common sight along the coast. Although these nets, and other bottom-dragging nets, cause severe harm in sensitive areas, in particular coral reefs and seagrass beds; there are many areas where they can be used without inflicting serious damage to the environment.

It is proposed that suitable areas where beach seines can be used be identified and demarcated, using scientific data but in co-operation with local communities. Beach seines, suitably licenced and inspected for legality, would be allowed to be used in these areas, and the ban on the nets strictly enforced in all other areas.

Each licenced net should be tagged with a unique number and allocated to a particular area and for use by a particular fisherman. Catch records would have to be kept, and the regular submission of these records would be a condition for retention and renewal of the licence.

The demarcated areas would have to be surveyed before being opened, taking into account the amount of (illegal) fishing that is already taking place and existing damage to the environment. The

open areas would then have to be monitored on a regular basis, comparing them to similar, but unfished control areas.

In the closed areas, and especially the control areas, the ban on beach seines would have to be strictly enforced.

Action steps:

- Identify areas where beach seines will be allowed
- Launch an information and education programme that informs communities of the damage that the gear can cause in sensitive areas and the long term impact of this damage to their livelihoods.
- Licence beach seine nets for use in those areas.
- Legally licenced nets to be tagged.
- The ban on beach seines to be strictly enforced in the closed areas.

5.4 Provide training for fisheries officers to investigate and prosecute fisheries crimes.

Many fisheries crimes, especially such crimes as dynamite fishing are a form of organised crime. Merely arresting the small fry, the fishermen, will not solve the problem. Fisheries officers need investigative skills in order to build strong cases against not only the fishermen but especially against the kingpins that drive the business.

The same applies to building cases against commercial vessels and companies engaging in illegal fishing in the EEZ and territorial waters.

Training courses and workshops for fisheries officers, police and prosecutors will help to develop these skills and help to reduce the level of offences. There has already been limited training in this field by programmes such as SMARTFISH, but it is important that all fisheries officers have the skills to do routine investigations, while a small group of specialist investigators should be trained to investigate the more serious fisheries related crimes.

Police investigators often do not have the specialised knowledge of fisheries matters required to effectively investigate fisheries crime.

A basic course of this type has already been offered to some officers in Tanzania. An advanced course would consist of one week of theory and one or possibly two weeks of practical work in the field assisted by the trainers.

The cost of the course would be as follows.

Cost of venue (Based on the Fisheries Training Centre at Mbegani):	USD8 per person per day
Catering:	USD 15 p.p./day
Cost of Trainers (Based on 2 trainers)	USD 700/day

Additional costs would include airfares and per diem for the trainers.

Action steps:

- Identify suitable trainers to present courses in the following:

- Basic methods of investigating crime, in particular fisheries crime
- Collection of evidence and the correct procedures for preserving the evidence
- Preparing cases for prosecution
- Presenting evidence in court.
- Present training courses to all fisheries officers from mainland, Zanzibar and DSFA. Selected officers from the districts could be included in these courses.
- Subsequent to the courses the progress of cases should be monitored and the success of prosecutions evaluated.
- Officers seen to have particular aptitude or interest may be selected for further training and inclusion in the proposed undercover units.
- Prepare SOPs for investigation and prosecution.

5.5 Develop funded patrol plans to counter IUU fishing in the coastal zone and the EEZ.

Lack of funding inhibits the ability to patrol the coastal and interior waters. Many of the small patrol vessels available for such patrols are not operational due to a lack of funding.

Patrols targeting the times and places with the highest incidence of offences such as dynamite fishing would contribute greatly to preventing the offences, while allowing time for investigators to find and prosecute the main perpetrators. Patrol plans should include elements of routine patrolling in high-risk areas or at times of high risk, as established through a risk assessment procedure. In addition to routine patrols, ad hoc operations, based on intelligence reports should target specific suspected incidents. In order to maintain an element of surprise, ad hoc patrol operations may be initiated from outside the local area.

The routine patrols, should not be too predictable, but should be there to act as a deterrent, rather like the old-fashioned “Bobby on the beat.” It is true that routine patrols appear to be a waste of time and money, as they are to an extent predictable and avoidable. However, that is true of visible policing of any kind. The very presence of patrols reduces the opportunity for illegal activity, and serves to discourage the more opportunist lawbreakers. The routine patrols are also an opportunity to inspect vessels at sea and thus provide in situ data that can be used to verify shore inspections and contribute to stock assessments. The routine patrols will thus be required to perform inspections on a routine basis and to produce the completed inspection forms.

Co-ordinated patrol plans, complete with budgets, should be developed to address particular problem areas, such as destructive fishing methods. Plans should be based on a structured risk assessment exercise that will identify priority areas for surveillance operations. The responsible officers should be trained in both risk assessment and planning. There has been some basic training in these areas, but further and more specialised training is required. There is sufficient regional expertise available to provide such training. In the short term, technical assistance may be required to mentor the managers both at headquarters and in the regions.

Standard Operating Procedures for patrols were prepared in the early 2000’s. These SOPs must be reviewed and then used.

The recommissioning costs and operating costs for the inshore patrol vessels are reflected in the tables below. The number of 7 metre vessels needing refurbishment could not be accurately determined.

Recommissioning costs: Per vessel

Vessel	Item	Cost (USD)
MV Doria Uvuvi I (Mother Ship 12m)	General service and Repair	\$37 000
MACEMPII (Mother Ship 12m)	General service and Repair	\$12 500
7 meter patrol boats (±14 boats) Per boat.	General service and Repair	\$6 200

Daily running costs will vary greatly, depending on the patrol profile, the range of the patrol and the type of vessel or vehicle. The two 12-meter boats are based in the south while the 7-meter boats are stationed along the coast. The table below reflects the daily costs of operating the patrol boats and the tow vehicles required to move the 7 metre boats. The quoted costs appear rather high. Fuel consumption could possibly be reduced by using conservative driving techniques.

Total cost is based on the vessels being operational for 250 days per year. Weather and the actual requirements of the individual regions will govern the actual cost of running each vessel.

Running costs: per unit.

Type	Fuel requirement per day	Cost/ day (USD)	Cost for 250 days (USD)
12 Metre Mother ship	640 litres Diesel	\$870	\$217 500
7 Metre patrol boat	240 litres Petrol	\$325	\$81 250
Tow vehicle	50 litres Diesel	\$68	\$1 700

Patrolling the EEZ is vital for the protection of the offshore resources, in particular the migratory tuna stocks that are fished in Tanzanian waters. Seagoing patrol vessels must have the capability of staying at sea for extended periods and covering large geographical areas. Large vessels are necessarily expensive to operate.

Chartered aircraft for patrols are equally expensive to operate, but can cover very large areas of ocean in a short period of time and are difficult for illegal vessels to detect and track. Cost would depend on the type of aircraft used and the frequency and length of the charters.

These estimates would vary depending on the amount of patrolling done and the type of patrol vessel and aircraft used, but are indicative of the funds needed for comprehensive patrols. Although the cost is high, it is very possible that the cost of the patrols will be recouped by extra revenue generated from fishing licences, royalties on catches and fines.

Chartering Patrol Vessels: Estimated annual cost.

Type Of Patrol	Cost Category	Duration	RATE (\$)
Air patrol	Aircraft Charter	120 Hours	\$244,445.00
	Operational cost and tools		\$28,895.00
Sub total 1			\$273,340.00
Sea patrol	Vessel Charter	192 Days	\$160,000.00
	Operational cost and tools		\$10,880.00
Sub total 2			\$170,880.00
Grand total			\$444,222.00

Action Steps:

- Survey all patrol vessels to ascertain their level of seaworthiness. (This has already been done, but needs to be kept up on an ongoing basis)
- Train boat skippers and engineers.
- Identify suitable offshore vessels for EEZ patrols.
- Conduct risk assessment exercises to determine the most cost effective patrol strategies to meet the needs of Tanzania.
- Develop adequate budgets to implement patrol plans and source the revenue needed.

5.6 Investigate the feasibility of creating one or more undercover units with the specific task of combatting high priority fisheries offences such as dynamite fishing.

Visible patrols can, by their very visible presence, help to combat illegal fishing. However, the very visibility of patrols, and the ease with which information about conventional patrols can be transmitted by cell phone means that apprehension of the perpetrators is unlikely.

Undercover teams can do the actual investigation while the visible patrols act as deterrent and decoys. Such teams would require specialist training but will also need expert input and suitable funding, at least in the early stages. These teams would have to work in co-operation with police, customs and other agencies to fulfil their task.

The combating of dynamite fishing would be an ideal pilot project for such a unit. A group of selected and trained officers should investigate the people behind dynamite fishing, including:

- a. The source of the commercial explosives used,
- b. The organisers of the activity,
- c. The buyers of the fish

The officers comprising this group would in all likelihood consist of a mixture of specially trained fisheries officers and police officers. Training in investigation is available and some training has already been provided the Smartfish.

Action steps:

- Select suitable fisheries officers, police officers and others for specialist training.
- Present the training based on theory and practical work.
- Make provision for the trainers to work with the undercover team after training in actual investigation as advisors.
- Use the team(s) to target specific fields of fisheries crime, in particular dynamite fishing.

5.7 Provide workshops and other opportunities designed to train managers in the theory and practical skills of MCS management.

Senior and middle managers in the fisheries field often do not have the time to keep up with developments in fisheries management. A series of workshops, targeting fisheries managers at middle to senior management level and covering subjects such as fisheries management, MCS management, planning and budgeting and risk assessment would increase the participants' skills and

insight into the management of fisheries and MCS operations. Although these managers already have an acknowledged level of skills and training, the interaction and fresh ideas derived from such workshops will almost certainly enhance their abilities and contribute to more efficient and effective execution of their duties. Training in risk assessment, planning and budgeting will increase capacity to function effectively.

Action steps:

- Develop suitable short management courses. (Senior staff often cannot spare more than two days)
- Identify suitable presenters. (There are several available in the region.)
- Sell the concept to the managers as a seminar, rather than a training course.
- Use appropriate case studies in the seminars

5.8 Investigate avenues of ensuring sufficient revenue to fund an effective MCS system.

MCS in both Mainland Tanzania and Zanzibar is underfunded, resulting in a lack of sufficient control over the fisheries.

The Deep Sea Fishing Authority retains 50% of the revenues from licencing to fund its operations. Although this is not sufficient for all its requirements (present income ±USD 500 000 per annum, amount required ±USD 1 000 000), such as the funding of patrol vessels, this is a model upon which funding for other MCS activities can be based.

Licence fees for coastal fisheries are paid into the fiscus. It is suggested that a system similar to that used by the DSFA be investigated for all MCS activities, including the BMUs. In addition an investigation of a system of levies on catches should be investigated to supplement the revenue available for MCS and other fisheries management actions.

Another option that would bear investigation is something similar to the Marine Living Resources Fund in South Africa, which is maintained by a government contribution as well as by licence fees, levies and fines. (<http://www.daff.gov.za/>)

Action Steps:

- Investigate suitable funding models for MCS, based on the ‘user pays’ principle.
- Determine the needs of the different sectors, such as DSFA, BMUs etc.
- Establish the contribution that can and should be made from central revenue sources. (Taxes)
- Determine other sources of revenue such as licences, catch levies and other user fees that will support the MCS and fisheries management structures.

5.9 Review and update the Standard Operating Procedures adopted a decade ago to reflect new needs.

Standard operating procedures (SOP) are a set of rules, effectively a checklist, allowing procedures to be standardised. A comprehensive set of SOPs were prepared about ten years ago under the auspices of the EU/SADC MCS programme. It would be wise to review these procedures in the light of changed circumstances and the adoption of the new fisheries laws.

Action Steps:

- Review the existing SOPs and amend as required.
- Implement the use of the SOPs. Each officer must have a copy and be required to use the SOPs in his daily work.

5.10 Provide training for VMS operators at DSFA

The VMS system is an invaluable tool for tracking licenced fishing vessels operating in the EEZ and territorial waters. The limitation of VMS is that it can only detect and identify vessels that are equipped with VMS and are transmitting signals. This means that VMS will only track legally licenced vessels. (This does not mean that vessels do not sometimes make mistakes and enter closed areas while still transmitting.) The value of VMS is greatly enhanced by close co-operation between neighbouring countries. Exchange of information, such as the entry and exit of vessels from neighbouring EEZs can aid in tracking down illegal vessels.

The VMS as such can only give identity, position, heading and speed. Most VMS systems allow catch data to be sent to the receiving station. However, this is still dependant on the manual entry of that data by the vessel. The present VMS system should be assessed by an expert and additional modules identified to expand the capabilities of the system if it is required.

In order to gain maximum benefit from the equipment, the operators require a thorough knowledge of both the equipment and the techniques used for analysing the data received to establish the movements and behaviour of fishing vessels.

The most economical way of training the operators is to bring an instructor from a country that is well versed in the use of the VMS, such as the Seychelles. The instructor would then work with the operators using their equipment and helping them become familiar with the environment in which they are working.

The costs of such training, which will take a week or perhaps two, is reflected in the table below.

Activity	Description	Amount (\$)
Travel, allowances and subsistence for an expert to come to Tanzania	Tickets	\$2 000
	Allowances	\$5 000
Total		\$7 000

Training in fields such as patrol planning and risk assessment should be provided to enhance the ability of the operational staff to operate efficiently and cost effectively.

These interventions will strengthen the capacity of the authorities in Tanzania, at all levels, to combat IUU fishing and to ensure the sustainability of marine resources for future generations. It is hoped that improved management skills will contribute to a more sustainable fisheries management system in the country.

The only operational VMS system in Tanzania is the one based at the DSFA operations room. This has limitations, especially in the case of a breakdown in electricity supply or data lines. In the past there was an operations room at Mbegani, but this was moved to Dar es Salaam and is now not operational. If funds permit it would be recommended that this operations room be resurrected. This would allow the tracking of inshore fishing vessels equipped with VMS. There are presently no inshore fishing vessels in Tanzania that are equipped with VMS. This might change in the future if the prawn fishery revives or if the requirement for VMS on vessels is expanded. Most current VMS systems have the option of accessing the VMS information online. All it requires is access to the internet and a computer. It is thus possible for the VMS data to be monitored at a place separate from the operations room, using a laptop or desktop computer. Although this system lacks some of the functionality of the full system, such as the ability to poll a vessel, the low cost makes it an attractive option. Establishing a second operations room would be more costly, although there would be several options available. Maintaining an operations room is in itself expensive, as it should be manned on a 24/7 basis.

At present DSFA has no way of detecting illegal vessels that are not using VMS. This is a problem that is shared by almost all countries in the region. The solutions to this problem are all expensive, and have varying levels of effectiveness. Coastal radars can detect vessels at distances of 100 nautical miles, but the installations are expensive, complex and require highly trained maintenance and operational staff. Tanzania does have a chain of islands that can stretch the range of such radars, such as Unguja, Pemba, Latham and Mafia. This type of equipment is of military standard, and probably beyond the capabilities, both financial and technical, of a fisheries organisation. Radar can only detect targets, and in itself cannot identify them. Although merchant ships and large fishing vessels are required to have Automatic Identification Systems that allow the target to be identified, illegal vessels switch these off as a matter of course. The piracy situation in the Western Indian Ocean means that many vessels switch off their AIS to avoid revealing their presence to pirates, something that is exploited by illegal vessels.

Sea patrols and especially air patrols have the ability to detect all vessels, usually by sighting them. Airborne radar can stretch the aircraft's ability to detect a target, which is then visually identified. Aircraft cannot board and arrest a vessel, but can report the position and identity to a patrol vessel. Patrol vessels can cover a relatively small area, but have the advantage of being able to board, inspect and if necessary arrest a vessel. The ideal is to use a combination of systems in order to optimise the effectiveness of the patrol vessels.

Information shared between countries in the region can provide information regarding the movement of such vessels and can aid in the efficient deployment of patrol assets to detect and apprehend such illegal vessels. Once the funding for patrols has been obtained, and suitable Standard Operating Procedures have been adopted, the combination of VMS information giving the position of legal vessels and other intelligence will improve the DSFA's ability to apprehend illegal vessels. SOPs do exist, although they are now rather outdated and need revision.

5.11 Dynamite fishing.

The issue of dynamite fishing is particularly important in Tanzania. The practice is widespread and destructive.

Combating dynamite fishing is not just a fisheries matter. Dynamite fishing, like abalone poaching in South Africa and the illegal trade in ivory and rhino horn is an organised crime. Fighting dynamite fishing thus requires a combined approach by a variety of institutions, including police, customs, fisheries and health authorities. The situation is aggravated by allegations of corruption and political interference. The perpetrators are certainly ruthless, as the acid attack on a fisheries officer shows.

Thus far attempts to eradicate or reduce the practice have been largely unsuccessful. The patrol officers I went out with seemed demoralised and gave the appearance of just going through the motions. In order to act effectively there must be co-ordinated action.

- Political backing for the campaign must be established at the highest level. The President has previously shown his support for the fight against illegal fishing. This political support should be restated at all levels of political office, especially in the districts affected by dynamite fishing.
- Prosecutions of dynamite fishermen must be publicised. There were allegations that the courts in some areas were very lenient. Given the scope of the problem, there is a case to be made for the establishment of a special court, with dedicated and trained prosecutors and magistrates who are well versed in the applicable laws.
- Specialised task groups consisting of specially trained fisheries officers and police should be formed to actively investigate the crime and prepare prosecutions.
- The public must be encouraged to provide information. There should be a mechanism that allows this information to be given anonymously, as there appears to be justified concern of repercussions. A telephone line that is manned 24/7 is a simple and cheap way of doing this. Task teams must be able to react immediately on information received. The public need to see that there is reaction in order to maintain their confidence in the system. It is accepted that some of the information received will be false and intended to mislead.
- Patrols are important! Routine patrols are unlikely to apprehend perpetrators, but do have a deterrent effect, if only because they limit the opportunity for offenders. In addition to routine patrols, ad hoc patrols, driven either by hard intelligence or by local knowledge of favourable conditions for dynamite fishing in an area.
- The marketing channels for the catch must be closed. Fisheries officers in Tanga claimed to know where the fish was delivered and where it was shipped to, but were unable or unwilling to act.
- The allegations of corruption must be investigated and prosecuted. This is not easy, and will require specialised investigators and tools such as lifestyle audits.
- Transparency in these cases will promote public confidence that there are no sacred cows and should promote co-operation from the public.

It is only by continued and concerted effort that this can be defeated. Perhaps the most important single factor is political support for the campaign.

Indicative timescale for projects

Project	Time span	Actions	Output
Equip Beach recorders with the skills to collect catch data and do basic processing of data for their area in order to make first hand information on fisheries data available to communities.	5 years	Improve funding for BMUs. Professionalise the Beach recorders. Appoint mentors to BMUs to assist technically and in terms of training.	BMUs functioning efficiently as management and MCS bodies. Data collection improved in terms of coverage and quality
Take concrete measures to improve licencing and registration of fishermen and fishing vessels.	2 years	Develop a universal system of licencing fishermen and vessels that includes clear identification of all licenced vessels and a credit card type licence for fishermen.	100% licencing target achieved.
Improve systems of monitoring catch and fishing effort by artisanal and subsistence fishermen.	5 years	Improve data collection by developing practical logsheets and implementing basic data processing at BMU level.	Improved data quality.
Beach Seine fishing	3 years	Identify areas where beach seines can be used without serious damage to the environment. Clearly demarcate these and licence fishermen to fish in the demarcated areas. Strictly enforce the ban on this gear elsewhere.	Illegal beach seines eliminated
Provide training for fisheries officers to investigate and prosecute fisheries crimes.	3 Years	Train selected fisheries officers to investigate and prosecute fisheries cases.	Improved rates of prosecution and stiffer sentences.
Develop funded patrol plans to	Immediately from Project	Develop budgets and funding streams for	Effective patrolling of the coastal zone

counter IUU fishing in the coastal zone.	funds. 3 years from State funding.	effective sea and air patrols.	and EEZ leading to a reduction in illegal activities.
Investigate the feasibility of creating one or more undercover units with the specific task of combatting high priority fisheries offences such as dynamite fishing.	One year.	Establish undercover teams to investigate fisheries crime, in particular crimes such as dynamite fishing.	Reduction in organised fisheries crime and the apprehension of the organisers.
Provide workshops and other opportunities designed to train managers in the theory and practical skills of MCS management.	2 years	Workshops and practical training opportunities to teach new skills and refresh old ones.	Better MCS management and planning.
Investigate avenues of ensuring sufficient revenue to fund an effective MCS system.	5 years	Find innovative and practical ways of ensuring sufficient, ring-fenced funding for fisheries management.	Better funding for fisheries management and MCS
Revise SOPs	1 year	Review current SOPs	New SOPs approved, published and implemented.

People consulted.

28/10/13

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29/10/13

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31/10/13

Fumba Fisherman Mohamed Suleiman

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PECCA Management Committee, Pemba

S/No	COMMITTEE MEMBER	VILLAGE
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2	Hamran Mohammed Dadi	Chokocho
3	Khatibu Ali Hamad	Michenzani
4	Khamis Sharif Haji	Michenzani
5	Moh'd Omar Haji	Wambaa
6	Moh'd Ali Ramadhan	Makoongwe
7	Sharif Moh'd Sharif	Mizingani
8	Haji Sheha Faki	Kisiwa Panza
9	Sheikhan Aman Sheikhan	Shidi
10	Abdalla Moh'd salim	Kangani
11	Moh'd Sultan Suleiman	Mbuyuni/Ng'ombeni
12	Omar Haji Bakar	Chonga
13	Suleiman Khalfan Juma	Kilindi
14	Khamis Masoud Abeid	Mgelema
15	Haji Juma Khamis	Ziwani
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17	Juma Ahmada Nassor	Kwale
18	Sheha Kahtan Khamis	Ndagoni
19	Said Moh'd Salum	Wesha
20	Malik Juma Khamis	Shungi
21	Bakar Sharif Juma	Ukunjwi
22	Khamis Mbwana Bakar	Fundo
23	Moh'd Kombo Hamadi	Selemu
24	Khamis Ali Khamis	Mtambwe Kusini
25	Thani Juma Hamad	Gando
26	Haji Masoud Mbwana	Mtambwe Kaskazini
27	Sheha Hamad Khamis	Kisiwani
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The fishermen of Vitongoni Village, Chake Chake District, Pemba (The turtle hunters.)

4th and 5th November Tanga

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Nick	Hotel Owner	Bagamoyo		
Charles	Local businessman	Bagamoyo		
Abdul	Fisherman	Bagamoyo		

Bibliography

The Deep Sea Fishing Authority Act (1998)

The Deep Sea Fishing Authority (Amendment) Act, 2007

The New Marine Parks and Reserves Act 2009 – Private Sector Perspective

The Marine Parks and Reserves Act 1994

Zanzibar: Fisheries Act of 2010 (Act No 7 of 2010)

Mainland: Fisheries Act of 2003. (No. 22 of 2003)

Mainland: The Fisheries Act, 2003 (No. 22 of 2003): Regulations

Marine Parks and Reserves Unit (MPRU) Strategic Plan 2006-2010

Requirements for successful MCS training in addressing illegal unreported and unregulated (IUU) fishing. Yahye I Mgawe

Influence of coastal economic valuations in the Caribbean: enabling conditions and lessons learned. *Benjamin Kushner, Richard Waite, Megan Jungwiwattanaporn, and Laretta Burke*

Tanzania Dynamite Fishing Monitoring Network

<http://www.tnrf.org/en/dynamitefishing>

Tanga coastline infested with blast fishing: Peter Mohamed

<http://www.ippmedia.com/frontend/index.php?l=59517>

Harmonization Of Fisheries Legislation And Assessment Of The Implementation Of Fisheries Management Plans And Rights Based Management In The South West Indian Ocean. *Judith Swan*

Protecting East Africa's Marine and Coastal Biodiversity. *Report by the University of York.*

Options to Reduce IUU Fishing in Kenya, Tanzania, Uganda And Zanzibar. *Smartfish report SF/2012/21*

Establishment and Involvement of Village Fishermen Committees in Management of Fisheries in Zanzibar. *Zahor Mohamed El Kharousy and Bishara Juma*

Misuse of Norwegian Aid Funds in Tanzania <http://www.aftenposten.no/nyheter/iriks/UD-fant-feil-i-150-av-309-kontrollerte-bistandsprosjekter-7259607.html#.UfDssdJHKxA>

Draft of MACEMP Final Report, *World Bank*

Josaphat Kweka, Justin Musa and George Kabelwa: The linkages between trade, development and poverty reduction: The case study of fisheries subsector in Tanzania - Economic And Social Research Foundation

United Republic of Tanzania

**South West Indian Ocean Fisheries Governance and Shared Growth
Program (SWIOFish)**

Terms of Reference for a

**A diagnostic on potential measures to increase effectiveness
of Monitoring Control and Surveillance including
mitigating the impact of dynamite fishing**

August 2013

1. Background

Between 2005-2013 the World Bank financed the Marine and Coastal Environment Management Project (MACEMP) project which was a US\$ 65million project with the objective to strengthen the sustainable management and use of Tanzania's Exclusive Economic Zone, territorial seas, and coastal resources resulting in enhanced revenue collection, reduced threats to the environment, better livelihoods for participating coastal communities living in the Coastal Districts, and improved institutional arrangements. MACEMP closed on February 15, 2013 and among the project's important achievements were the strengthening and consolidation of fisheries management at the Union level, and harnessing of \$9.3m in revenue to the URT from the offshore fishery. Key issues affecting its implementation were: 1) over-ambitious project design, involving a multitude of activities and institutions ; 2) weak institutional capacity among implementers; 3) up-scaling of pilot activities to soon along the entire Tanzanian coastline; and 4) inadequate project monitoring and evaluation, making it to difficulties assess project impact.

At the regional level, the World Bank through IDA funds as well as GEF-financing supported the South West Indian Ocean Fisheries Project (SWIOFP), which closed on March 31, 2013. The SWIOFP, which brought together countries in the South West Indian Ocean, including Kenya, Mozambique, South Africa, Seychelles, Comoros, Madagascar, Mauritius, Somalia (observer) and Tanzania, was successful in building regional capacity for fisheries management, including through establishing a network of fisheries researchers and managers, and developing a regional management framework. Ultimately the Member countries of the SWIO Fisheries' Commission (SWIOFC) agreed to reform the Commission, promoting it from an advisory body to a Regional Fisheries Management Organization (RFMO) of the Coastal States – enabling it to take binding decisions on fisheries management.. Given the important achievements of SWIOFP, SWIOFC Member Countries have requested a follow-on project namely the South West Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish).

2. Program Objectives and Components

The SWIOFish Program, now under preparation, will support regional integration of fisheries management, while expanding the approach beyond research to strengthen sector governance and harness the value of coastal and marine fisheries to national economies. The proposed program will be a phased Adaptable Program Loan (APL), over a 15-year period, using IDA and blended GEF resources, together with parallel support from other donors and trust funds. Given the importance of sound fisheries management to livelihoods and economic growth, the Government of Tanzania has requested to participate in the SWIOFish. The SWIOFish APL-1 includes activities to be implemented over an initial five-year period, to contribute toward an overall 15-year, 3-phased program.

The overall SWIOFish Program Development Objective is 'to increase the sustainable economic benefits generated from SWIO marine fisheries, and the proportion of those benefits retained within the region.' The Project Development Objective for the SWIOFish APL-1 is 'to strengthen the regional and national capacity for effective governance of fisheries and aquaculture.'

A series of complementary regional investments and national investments would achieve the development objective by: (i) strengthening the countries' governance capacity to manage fisheries, including reducing illegal fishing activities; (ii) investments to increase the profitability and

sustainable production of fisheries and aquaculture and the proportion of the value-added captured by the countries; (iii) supporting policies that share the benefits from sustainable use of marine resources among the key economic drivers and which prioritizes poverty alleviation through co-management of fishing communities; and (iv) building robust regional cooperation on fisheries.

The Program will have four components namely: (i) improved governance of fisheries; (ii) increased fisheries contribution to national economies and (iii) regional collaboration; and (iv) a project management.

The first component will support the development of coherent fisheries policies with sound economic rationale and development trajectory as well as human and institutional capacity building to implement the policies and plans. This component would support the implementation of core policy instruments. Four activities are envisaged: (i) the establishment of a dashboard of indicators to track the progress of the sector towards its national policy and planning goals and provide a basis for adaptive management and adjustment of policies and programs; (ii) the economic management of selected fisheries and aquaculture with a focus on the most economically and socially important fisheries; (iii) the management of strategic public fisheries infrastructure, on an economically sound basis, with particular reference to non-performing assets; (iv) design and implementation of a national framework for small-scale fisheries co-management.

The second component will support: (i) the reduction of critical constraints to business, (ii) viable community fisheries businesses and SMEs and (iii) strategic hard and soft infrastructure planning and building.

The third component on regional collaboration will finance activities that will include (i) tuna fisheries management and monitoring control and surveillance, directed particularly at Illegal, Unreported and Unregulated fishing activities; (ii) support for target fisheries and associated management of bycatch; (iii) regional knowledge exchange on fisheries management; and (iv) technical support for the regional coordination process hosted by the SWIOFC.

3. Rationale for the Consultancy

Monitoring Control and Surveillance (MCS) underpins effective management of marine resources. The full extent of Illegal, Unreported and Unregulated (IUU) fishing in Tanzanian waters is unknown and responding to this threat is a high priority for Tanzania, particularly since they have an extensive coastline with an Exclusive Economic Zone (EEZ) that abuts the marine waters of three neighbouring countries. Tanzania also has international obligations in this regard to respond to IUU fishing and is also a contracting party to the IOTC and is obliged to comply with various resolutions to minimise IUU fishing including the applying Port State Measures.

Further, the monitoring and control of fisheries activities covers *Internal Waters* and the territorial sea shared between the two sides of the Union and is the collective responsibility of the fisheries directorates of Tanzania and Zanzibar. MCS in the waters beyond territorial seas is the responsibility of the Deep Sea Fishing Authority (DSFA) which is primarily a Union matter.

There is therefore an urgent need to assess the MCS capability of Tanzania in their marine waters and to identify the threats (including eg. dynamite fishing and other form of IUU fishing) and identify the MCS issues in the context of the region and those that may be unique to Tanzania.

4. Objective

- To identify the main threats to marine resources in Tanzanian waters,
- Assess Tanzania's capability to respond to these threats, and
- Design a 5-year MCS work programme to address these threats that can be implemented under SWIOFish to support the enhancement of Tanzania's MCS capability to help address the priority MCS issues incorporating an overall MCS strategy for Tanzania.

5. Scope of Work

The consultant should undertake the following tasks:

- a) Identify and prioritize the threats (scope, trends etc) to the Tanzanian marine environment and its resources that could be addressed through MCS including, by means of illustration, a diagnostic framework;
- b) Assess Tanzania's existing institutional MCS capacity including manpower, infrastructure, operations and resource allocations (funds);
- c) Review Tanzania's current MCS strategies, policies, legislation(s) and protocols and the extent to which these are adequate to respond to threats to the marine environment including in particular, IUU fishing;
- d) Identify all institutions that are needed to support the implementation of a consolidated MCS strategy and provide an opinion on the adequacy of the communication and coordination between these institutions to provide an effective integrated MCS system that is consistent with international best practice (including / advice on how these arrangements can be improved or better expedited);
- e) Given the results of (a) to (d), identify and prioritise activities needed to respond to the most urgent MCS needs related to the threats identified;
- f) Prepare a 5-year plan for implementation by SWIOFish to address the most urgent MCS issues to enhance Tanzania's MCS capability¹.

5. Expected Outputs/ Products

The consultant outputs are :

- Address each of the items provided in the Scope of Work given in Section 4 above;
- With the national implementing partners, help organise and participate in, a consultative stakeholder workshop to assist in the identification and clarification of threats and related MCS issues;
- A draft report including a summary of the results of the work scope in Section 4;
- A validation meeting presenting a draft report that clearly outlines the findings of the work scope given in Section 4;

- Submission of a final report that incorporates revision of the draft report and the outcomes of the validation meeting and comments from stakeholders as well as an Annex with the proposed 5-Year plan for implementation by SWIOFish.

6. Timing and Reporting

The assignment is expected to last for 40 working days, including two missions to Tanzania (consultative workshop with interested and affected parties and a validation meeting with focal points).

The following timelines are expected to be followed :

Activity	Timing / deadline
1. Launch of consultancy	September 30, 2013
2. Mission #1 and submission of inception report and proposed project structure for the final report	Within 14 working days after signing the contract
3. Consultative workshop to identify threats and actions needed	Within first 30 days of contract initiation
4. Draft report completed and validation meeting with key stake holders (World Bank, Focal points)	By week of starting 4-8 November 2013
5. Submission of final report with all expected outputs incorporating recommendations and stakeholder inputs	November 30, 2013

7. Supervision Responsibility

The consultant will work under the overall management of the World Bank Task Team Leader Ann Jeannette Glauber and under technical supervision of David Japp (FAO).

Focal Points : Tanzania :

Zanzibar :

DSFA :

8. Qualifications of the Consultant

The consultant should have:

- (i) At least a Master's degree or equivalent in a discipline related to fisheries management and/or natural resource assessment, with not less than fifteen (15) years of experience in a relevant field; Extra credit for PhD.
- (ii) At least 10 years of demonstrable experience working on MCS in fisheries and/or natural resources management in developing countries and. Experience in East Africa preferred.
- (iii) Wide experience and interaction with regional and international projects as well as good networks in fisheries management and MCS;
- (iv) Ability to communicate effectively in English both orally and in writing;
- (v) Strong report writing and analytical skills are required.