Rapid Assessment of the Tanzanian Commercial Trawl Fisheries: Management Issues and By-Catch Reduction Strategies

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TCMP Technical Report

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Tanzania Coastal Management Partnership
for
Sustainable Coastal Communities and Ecosystems in Tanzania
(Cooperative Agreement Number: 623-A-00-05-00339-00)

A partnership between:

United States Agency for International Development / Tanzania
National Environment Management Council
Coastal Resources Center, University of Rhode Island

COASTAL RESOURCES CENTER
University of Rhode Island

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Introduction

A rapid assessment of the current fisheries situation in Tanzania was undertaken with various stakeholders during the period of January 28- February 4, 2008, as preparation for a workshop on the use of BRDs and TEDS.

One of the long term objectives of the USAID Tanzania Coastal Management Partnership is to improve the adoption of sustainable fishing practices within the Tanzanian trawl fishery by working with the private sector trawl operators, vessel owners and the boat captains, to reduce marine turtle mortality and finfish bycatch in the trawl fishery and to reduce its impacts on the small scale fishery. There is considerable pressure from the environmental community to adopt the use of Turtle Excluder Devices (TEDs) in the shrimp nets. There is universal concern over the catch of juvenile fish in the small mesh trawls. There is conflict between the artisanal and commercial fleet over the bycatch of fish in the trawl fishery, especially the reef associated fish and pelagics. There is concern over bottom damage being caused by both fisheries sectors and interactions between them in overlapping fishing areas.

These issues are overlaid on a general downward trend in landings of both shrimp and finfish for both sectors. The Tanzanian Government is concerned about the high effort levels and lack of knowledge about these species. There is a proposed closure of the shrimp trawl fishery for the next two years to try to better understand the resources in Tanzanian waters.

Perceptions of Stakeholders

Mbegani Fisheries Development Center

The Mbegani Fisheries Development Centre for Fisheries Education and Training is located north of Dar es Salaam near Bagamoyo. This Centre is a training school for marine related programs such as gear and processing. We met briefly with the Centre Director, Mr. Yahya Mgawe. They are currently working with the Japanese to upgrade their facility and develop programming. A course in engine repair was currently underway with Japanese assistance.

They have three main buildings on the campus: offices, gear building and processing laboratory. They are in the process of setting up pilot aquaculture ponds.

Captain Damian Chando is the fisheries gear specialist. He is currently preparing to provide training to the industrial sector on TEDs and BRDs and had two samples in his office. One was a pre-2003 opening hard TED built from aluminum. The second was a framed open window BRD. He is currently unfamiliar with their operation and rigging. He was in favor of the square mesh opening BRD. This design is similar to others currently used in Kenya and Mozambique that have been introduced by FAO.

The Centre is interested in participating in the development and testing of the BRDs and TEDs to be used in the Tanzanian shrimp trawl fishery.

They have three training vessels. The largest was an approximately 50 ft steel vessel (M/V Mafunzo) that was rigged for single bottom trawl operation with steel v-doors (not local shrimp trawl gear). They had storage capacity in the hold for catch and ice (not freezer). The second was an approximately 40 ft fiberglass vessel and the third was an approximately 30 ft wooden vessel (M/V Elimu). None of the vessels are similar to those operated by the commercial fleet.

Mkuranga and Bagamoyo Districts

We met briefly with Mr. Mganga, Natural Resource Officer from the Mkuranga District. Mkuranga is located south of Dar es Salaam and is an area of shrimp trawling. He offered his opinion regarding the fisheries situation. Part of the problem is the disconnect between the central fisheries authority and the district fisheries offices. For instance, the licenses for the industrial shrimp trawlers are issued by the Dar es Salaam ministry with no consultation of the local fisheries districts. There is also a perception of unfairness in the regulations. The use of small mesh has been banned in the artisanal fishery, yet is allowed in the industrial fishery. However, the shrimp trawlers have a closed season and

are restricted to day time fishing only, whereas the artisanal sector has no such restrictions on place, season or time. There is significant conflict between the industrial and artisanal fishermen. The shrimp trawlers come very close to shore and occasionally destroy artisanal gear. The discard of small fish by the trawlers (although they are encouraged to sell their catch) is another problem observed by the artisanal sector.

Invitations to become crew on the industrial trawlers were not personally made to the artisanal fleet although this was successfully pursued on an individual basis by some artisanal fishermen.

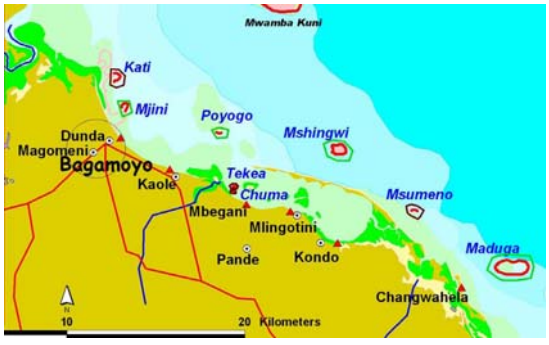
In Bagamoyo, there is a small scale fisheries landing area where fish are brought in from the boats and either processed or sold fresh to the public. Most of the fleet consists of small outrigger-style fishing boats powered by sail. They arrive in the PM with their catch and barter with the middlemen/women to sell their catch. Since catch is taxed by the district at a 10% rate, it is unknown how much of the catch is actually sold in this location or if some is held back. After the tax, the rest is divided up by some percentage between boat, owner, captain and crew. Most of the fishermen operating the boats do not own them. They belong to another fisherman or middleman.

Once the catch is sold, they are processed on the beach or taken to the central area for frying and selling to the public. This fried fish preparation is a fairly new product and is taken inland by the women for road side sale. However, this might be contributing to the spread of HIV-AIDS since sex may be part of the sale arrangement.

There were many species of fish observed in the market, dominated by bream, and small reef fish. There were some needlefish and larger jacks, squid and octopus.

Central Coordinating Committee

The Central Coordinating Committee (CCC), is made up of representatives from 7 villages along the coast in Bagamoyo. The CCC is the body that works with the reef closed area management zones under the Collaborative Fisheries Management Plans (CFMs). We met in the District



Office with Fisheries officers Yakeboha Nyakiboha, January Lilungulu, and Abudakar Mposo with three representatives from the CCC, Chair, Shedadi Omeri, Shanai Said and Kessy Salum. We participated in a 3 hour discussion with the fishermen about issues and solutions regarding the conflicts between the sector and the industrial sector as well as obtained information about the fishing methods.

In discussions regarding the trawlers, it was mentioned that the bycatch is now retained and sold to middlemen and then sold at market. Buyers must go to the trawlers by boat to purchase the fish. There is competition among the fish buyers.

There is considerable friction between the artisanal and commercial fleets. The artisanal fishermen feel that they are not able to compete with them for the resource. Many times, artisanal gear is destroyed or no fish is available for capture. The size and quantity of the catch has decreased over time coincident with the trawling activities. They feel that there is not enough fish left to support their sector and that the shrimp vessels catch many of the migrating pelagic fish before they reach the Bagamoyo area. The catch has decreased so much that some of the traditional intensive fishing methods have been discontinued such as the pound net that is built from stakes. Another change in their fishing tradition has been the need to migrate with the fish. The first immigration was of fishermen from Zanzibar to inshore areas. However, now many fishermen must travel. The price of fish has increased over the last 5 years. Most of that increase is due to tourism. It is almost impossible to find fish at the local market on the weekends.

Common fishing gears include beach seines, gillnet (PP 1.5 inch mesh), and hook and line. Gillnets are surface to bottom in around 3 m depth and sometimes catch turtles. They fish every day and at all times of the day. Fish are seasonal and pelagic species such as tuna and kingfish are most abundant during the NE winds (March to May), followed by a period of low fish production during the SE wind period (June-September). Many small fish are caught during the rainy season. The shrimp season corresponds to the low abundance period. It now only lasts from June through September. Bait used for the hook fishery are squid, fish, and polychaete worms (mwata). Boats used in the small scale fishery range from 11-15 ft and carry between 2 to 35 people. Gillnet boats use 12-35 people while hook and line use 2-3/vessel. Most are sail powered, although some outboard engines are used. Other vessels are larger and are mostly for transport.

Their first recommendation was that the shrimp vessels leave the inshore areas and concentrate on deep sea fishing. They also feel that developing no trawl areas close to shore with appropriate enforcement might help alleviate the conflict problems. They were very interested in the TEDs

and BRDs and asked for our opinion on the best way forward. We suggested that some sort of balance arrangement be worked out fisherman to fisherman to help with the bycatch issues, however the long term solution must include some rebuilding to sustainable fishing practices.

Their ideas for the pilot program:

- They would like to participate as observers or crew during the at sea trials.
- They felt the water was clear enough for u/w cameras
- The best time would be March-June
- No difference in bycatch composition between the three shrimp zones.
- Jellyfish are in highest abundance in Dec, Jan, Feb, Mar.

Sea Sense

Sea Sense is an NGO concerned with turtles and marine mammals welfare. We visited the office but were unable to talk with the director, Catherine Muir. However, we were able to talk via phone and invite her to the workshop. She participated in a rapid assessment evaluation of bycatch in the commercial trawl fishery and the artisanal gillnet fishery. No report is yet available, but she relayed that they captured 16 turtles on 4 vessels over 60 fishing days in the three shrimp areas. They caught 8 in the gillnet sets but no there was no information about overall effort..

World Wildlife Fund (WWF)

We met with staff from the World Wildlife Fund staff, Dr. Amani Ngusaru (Regional Tanzania Office) and Jason Rubens, Program coordinator for Tanzania Office. Dr Ngusaru shared his experiences with TEDs in Mozambique, and felt they made a mistake in the introduction that he believes has resulted in the fishermen removing their TEDs today. They had promised that there would be a financial incentive to the fishermen by increasing markets and improving quality. However, the world market shrimp prices have decreased dramatically over the last few years and that has not occurred.

They were very interested in collaborating with us on a pilot program. The main interest expressed by Mr. Rubens was for fish bycatch reduction and not such an emphasis on turtles. They have a new worldwide campaign on bycatch and are looking for a few projects that can highlight progress. WWF has attempted to introduce legislation to try to

make TEDs mandatory but the Fisheries Department would like to see devices pilot tested first.

Tanzania Industrial Fishing and Processing Association (TIFPA)

We visited a commercial vessel moored in Dar es Salaam harbor. The boat was being prepared for departure in 2 weeks. Since there will be a closed season for 2 years in Tanzania, these boats will travel to other countries. This vessel will travel to Yeman and later to Mozambique before returning to Tanzania.

The trawlers appeared to be old European boats for the most part. Current regulations on shrimp trawlers require at least 11 m in LOA because of the need for refrigeration due to distance from landing facilities and export markets.

Each boat uses outriggers with one net each. Current regulations limit them to only 2 nets. Most vessels outriggers swing aft instead of raising up; all winches were hydraulic as well as the cable guides.

The vessels we visited were 21 and 24 m respectively. The 21 m had a 365 hp diesel, the other 500 hp. They each had 2 generators. They can be at sea for a maximum of 30 days. Hold capacity is 30 tons, each freezer had the capacity of 480 kg/freezer (total 2 blast freezers). Each boat had a crew size of between 21-24 and included an Indian captain, a Master, chief engineer, quality control and fishing crew.

There was no net on the boat at this time, but the doors were approximately 10ftx40in, or similar metric measure, built of full 2 inch lumber with 1x6 irons. Different attachments for the chains used in the South Atlantic US fishery, but appeared receptive to chains. No nets are purchased; they buy webbing and the crew builds them. Mesh size minimum is 50 mm, approximately 2 inch stretched mesh. The captain mentioned that they have

recently gone to a smaller diameter twine to reduce drag and thereby fuel cost. Chains are used in the footrope but we received no comment regarding a tickler chain. Tickler chains are now illegal to use. They tow to a maximum of 30 m depth on sand and mud bottoms and tow duration of no longer than 3 hours. They have bycatch of fish, including barracuda, a few turtles and their gear occasionally bogs down with heavy mud. Incoming tide yields best catches. No fish bycatch is discarded and it is sold. They can only tow from 6 AM to 6 PM. Shrimp/prawn is sorted on deck, graded by size & species, frozen as packages in 2 Kilo boxes, then stored below.

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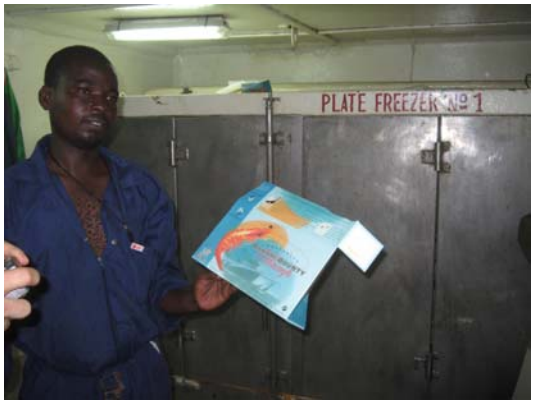
The vessel we visited seemed well equipped with Simrad GPS plotters, not tied to computers, Furuno radars, and echo sounders. We noted evidence of a satellite phone. This vessel had hydraulic steering (6 inch wheel), but the captain indicated others had mechanical /power steering. All seemed equipped with life rafts on deck. When asked about TEDs, captain indicated that when they go to Mozambique, they are required. If asked if they would use them if they were not required, he said " The way business is today, it is the right thing to do".



Shrimp Net

We were later able to see a net used in the shrimp trawl fishery down at the Dar es Salaam dock facility. It was spread out on the dock when we arrived, but no chain sweep was attached. The net was described as a 4-seam shallow water net for 24 m vessel. It had a 33 meter head rope length, assumed was 50 mm stretch mesh, double braided sapphire knotted webbing in body, 45 mm stretch mesh in cod end. Large mesh cover for chafing gear. They no longer use tickler chain, but use galvanized cable for footrope and indicated they add 50-60 kg of chain. Trawl bag/codend net was rigged for choker strap loops.

The captains place blame for low shrimp abundance on artisanal method called "wandos". This is a weir made of fine mesh and stakes that can completely seal off rivers/estuaries during ebb tide. This catches all size shrimp. It was also pointed out that wandos are illegal in Tanzania.

Another boat we saw was being rigged for fish trawling offshore. Originally an American rigged boat, it was being fitted with gallows frames. They indicated they would be limited to 300 m because of winch capacity. Steel V-doors will be used.

Market-Artisanal Catch

All the fish available at the market were captured by the artisanal fleet. We toured the fish market "Ferry" at Banda Beach. Within sight of the market, two fishermen were using an illegal small mesh beach seine. There was little activity in the auction area because of low fish abundance. After buying the fish at auction (mostly women), they are sold to the retailers nearby which sell them to restaurants and private homes.

The Tanzanian Fisheries Research Institute - TAFIRI

The Tanzanian Fisheries Research Institute (TAFIRI) is located in Dar es Salaam. TAFIRI is charged with conducting research in support of fisheries planning. We met with the Director, Dr. Yahana Budeba and the Director of Research, Dr. Benjamin

Ngatunga. They run the observer program that collects information for the shrimp industry (1observer/boat/area). The stated bycatch rate of fish overall is 1 kg shrimp: 20 kg fish. They used to discard bycatch to leave space for shrimp product, however they now are required to retain bycatch. Larger fish tend to be captured in the artisanal gillnets rather than the trawlers. There has been a change in size and quantity of fish caught as bycatch over the last 5 years. TAFIRI is interested in collaborating in a Pilot Research Project to examine TED/BRD use in the shrimp trawl fishery.

Trawl Fisheries Workshop

This workshop was proposed as a first step towards bringing a co-management approach to the management of the fisheries. The objectives of this workshop were to:

1. Introduce TED and BRD technologies to the trawling industry and other local stakeholders: how they work and their impacts.
2. Identify suitable TED/BRD designs that would be most applicable for Tanzania.
3. Develop a collaborative applied research design and plan for testing a TED and/or BRD design appropriate to the Tanzanian context which can assess suitability to the local fishing context.

There were 29 participants (not including the speakers) on day 1 and 27 on day 2. There were representatives from the Tanzania Fisheries Research Institute (TAFIRI); Tanzania Industrial Fishing and Processing Association (TIFPA); Ministry of Natural Resources and Tourism, Fisheries Division; Mbegani Fisheries Development Centre-Bagamoyo; ICM Facilitator; Fisheries Officer, Bagamoyo District; Community Conservation Committee (Artisanal sector); environmental groups (WWF, Sea Sense, and Sand County) and TCMP.

The workshop was organized to be a combination of presentations and hands-on demonstrations and discussion facilitated by Dr. Kathleen Castro, fishery biologist, from the University of Rhode Island. The specific TED/BRD technical advice was provided by gear specialist, Captain Lindsey Parker from the University of Georgia, Marine Extension.

The acting director general of Fisheries, Mr Gonza Mbilinyi, opened the workshop by expressing his commitment to the agency goal of achieving a healthy, equitable and sustainable fishery for Tanzania. Marine turtles are protected under Tanzanian law. He supported the exploration of using innovative gear designs as a way to increase export earnings, food security and employment within the country, and work towards sustainability. This was followed by opening remarks from Mr. Lazaro Nhwani from the Tanzania Industrial Fishing and Processing Association (TIFPA) who stated the importance of a sustainable fishery to all fishermen and his willingness to be involved in the discussion and follow up action plan to be produced by the workshop.

Dr. Kathleen Castro began by discussing the general changes in fisheries and fisheries management that have occurred over the last two decades. She provided an overview of fish behavior and how species-specific behavior can lead to effective gear modifications and bycatch reduction. She discussed several current projects and gears to specifically reduce finfish bycatch in a multispecies fishery complex. Questions and general discussion followed her presentation.

Lindsey Parker then spoke about the evolution of TEDs in the USA fishery starting with the NMFS designed TED and working up to present with the soft double cover TED. He had two actual TEDs and two model nets with TEDs in them and was able to demonstrate the placement of the TEDs in the net and advantages and problems with each type. He discussed specific problems with TEDs such as twisting, debris, stretching, cover knot alignment, and other issues that have appeared over time using TEDs in the USA shrimp fishery. He presented information about BRD devices currently used or tested in the USA and finished with various films showing TED and BRD performance. Questions and discussion followed. A brief overview of the work done to date in Tanzania were presented by Dr. Charles Mahika from the Tanzania Fisheries Research Institute (TAFIRI) and Capt Damian Chandu from the Mbegani Fisheries Development Centre. Dr. Mahika studied TEDs for his thesis in the 1990s and presented his relevant findings. Capt Chandu followed by proposing two devices he thinks will be appropriate for testing in the current Tanzanian fisheries.

The following was prepared as a summary of the first day's discussion among all the participants and was agreed upon by the participants at the start of Day 2.

- There was general interest and support for education/research in use of ways to reduce negative aspects of trawling
- Some bycatch of turtles in both industrial and artisanal fisheries
- Management concerns may lead to closure of the industrial shrimp fishery for 2 years
- Tanzanian experience is unique but can benefit from looking at countries nearby
- Multispecies fishery. Bycatch is utilized
- There is some data regarding effectiveness of TEDs in Tanzania
- Some in-country expertise and capacity exists
- Day 1 : Not complete agreement on moving forward. Day 2: Looking for a way forward
- Need to do exploratory sea trials with TEDs and BRDs

On Day 2, Dr. Castro presented a summary of Day 1 and achieved a consensus from the group that is represented in the results of Day 1. She then reviewed existing information on neighboring countries and the current status of TED use in their fishery.

- Mozambique
  - TEDs legislated but not yet successfully implemented. Need for more technical support
- Kenya
  - TEDs legislated, attempted implementation but not yet been successful. Need for more technical support
- South Africa
  - Will begin work with TEDs
- Madagascar
  - TEDs successfully legislated and implemented

Given the lack of success of implementation seen in Mozambique and Kenya, and the success seen in Madagascar, the factors that led to the success story in Madagascar were presented:

- Legislation enacted in 2003 but no enforcement until 2005. Multi-step implementation plan
- Interest and enthusiasm by industry
- Coordinated effort by government and industry
- Forum for continued facilitated discussion
- Political will of government
- Good technological support
- Process to convince fishermen
- Flexibility within regulations and applications of TEDs
- One TED manufacturer chosen for consistency

The participants were asked to keep these factors in mind as an action plan for Tanzania is developed.

She then led a facilitated discussion using the decision flow chart (See Action Plan for bycatch reduction section). The first step involved selecting the desired retained catch and the desired excluded catch. After discussion, the group listed turtles and juvenile snapper, grouper and rabbit fish as desired excluded species. Shrimp and other fish were listed as retained catch.

They also felt that the issues were different in Zone 2. The discussion also included other alternatives in addition to TEDs that could help with catch reduction and conflict resolution.
Those mentioned were:

- Zoning. Private industrial trawlers too close to shore.
- Close the reefs to industrial fishermen

- Competition between industrial and artisanal fishermen but government is working to try to address this. Meeting planned between two to help resolve the conflicts (Zoning in discussion).
- If community based, need benefit to community
- Closed season to do stock assessment and habitat information.

The next step was to determine which TED/BRD to begin testing. This was assumed to be a starting point and that as testing commenced, other designs might prove to be more effective.

- For Zone 2, the preferred device would be the double cover TED (super shooter) which is the best to retain shrimp. 4 inches + bar spacing is proposed. This will allow for small fish to pass through the TED grid and either be retained or pass through a square mesh panel. There was some discussion about the Thailand TED as to a reduced cost alternative to shipment from the USA.
- For Zones 1 and 3, a Nordmore Grate is proposed with a sorting grid of 14 mm. This will allow for exclusion of small size fish.

The plan to design field trials was the next discussion topic. The first question was who and how the co-management community could be involved:

- Industry- Charter vessel (crew, gear)
- Might need to buy nets to outfit with TEDs
- TAFIRI-Need to pay (4 researchers and 2 technicians) ($60/day/person)
- Mbegani – training center
- Captain and gear technologist from MNRT fisheries ($60/day/person)
- Government-Needs to give permission and funds (with continued discussion)
- CCC , District Fisheries Officer and Artisanal fishermen (4)
- TCMP (facilitation of process/funding)
- USAID
- Environmental Community – Sea Sense, WWF
- University of Dar es Salaam (technical help) ($ needed)

The trials would be best conducted during the 2 year closed season using paired trawls of 2 hrs each during both day/night (total 12 tows/day). Other concurrent activities would include:

- Continued discussion between stakeholders
    - for TED design
    - Reduce conflicts
- Need for training and trained trainers
- Time to get used to TEDS
- Provide this workshop report to MNRT Fisheries and follow up by TCMP

A general time line includes:

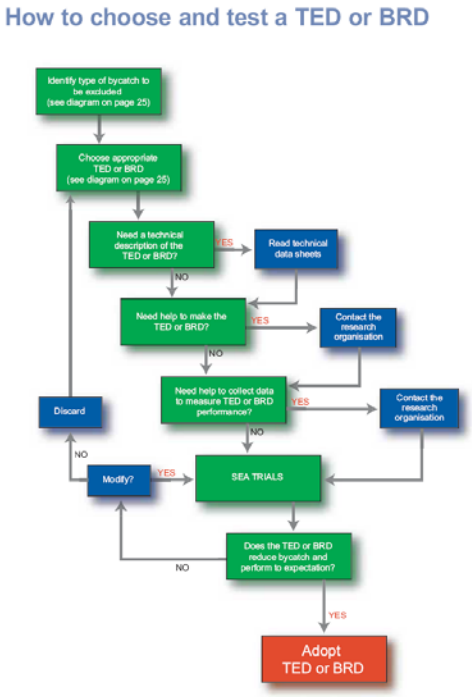
1. Report to MNRT Fisheries. (March 30, 2008)
2. MNRT Fisheries moves the process forward
3. Proposal (TCMP/TIFPA,TAFIRI, MNRT, private sector)
    1. Research, testing, training and education
    2. Continued dialogue
    3. Develop budget and investigate funding sources
    4. (First draft March 30, 2008)
    5. Final Draft July 1, 2008
4. Start research in Mar, April, May 2009
5. TCMP seed money can be used for training and educational processes or pilot process with industry boat or to develop quick snapshot on trawl vessel this year. TAFIRI offered to provide several of their researchers for this year. TIPFA offered that at an estimated cost of 2-2.5 K USD/day, the owners would retain a suitable vessel in TZ for the work for this year. He cautioned that a decision would need to be made quickly as current plans are for the vessels to depart TZ for the season.

The workshop was officially closed by TAFIRI Acting Director, Dr Yohana Budeba, and we proceeded to the dock facility to look at a shrimp trawl net currently used in the trawl fishery.

Action Plan for By-Catch Reduction

The following plan is the outcome of a stakeholder meeting held in Dar es Salaam in February 2008 hosted by TCMP.

The design of this action plan is guided primarily on the suggested procedure recommended by the FAO in the Guide to Bycatch Reduction in Tropical Shrimp Trawl Fisheries. The flow chart in Figure 1 describes the logical process for determining the use of a TED or BRD in the desired fishery.



The objective of this action plan is to:

1. Reduce the take of marine turtles and juvenile snapper, grouper and rabbit fish in Shrimp Zone 2.

2. Reduce the take of small fish and small shrimp bycatch in Shrimp Zones 1 and 3.

3. Reduce the conflict between artisanal and commercial fisheries sectors.

This will be accomplished using a research, education and outreach approach.

Research Project: Pilot Phase (2008)

The field component for the research will involve a small pilot project to evaluate the type of TED and BRD to use in the field trials. The field test would involve all the stakeholders including the shrimp trawl owners, TAFIRI, Mbegani Training Centre, MNRT Tanzanian Division of Fisheries, District Councils, Artisanal fishermen, TCMP, the environmental community and the University of Dar es Salaam.

The first trials (2008) will involve the use of the following devices:

- For Zone 2, Double cover TED bent bar grid (super shooter style) The use of > 4 inch bar spacing is proposed but will have to be fabricated. This will allow for small fish to pass through the TED grid and either be retained or pass through a square mesh window panel if installed.

- For Zones 1 and 3, a Nordmore Grate is proposed with a sorting grid of 14 mm. This is hoped to accomplish small fish exclusion.

These first trials will provide some statistical background for planning the appropriate number of replicate tows needed for the desired precision and accuracy. The results of these first trials will allow for modifications to be suggested for changes in design or combination of designs for more intensive field trials.

Research Project: Full Scale (2009-2010)

Once the appropriate devices are chosen, a full field test will provide the data to examine their effectiveness.

The field testing would be conducted on board a standard commercial shrimp trawler utilizing an identically rigged pair of their nets. One net will be rigged with the bycatch reduction devices, the other will remain as the standard net. The catches from paired trawls (2 nets) would be compared to determine the effectiveness of excluding of desired bycatch and retention of desired catch. Tows would be commercial length (2 hours each) during both day/night (total 8-10 tows/day). Catch from both nets will be multi-species and will require a great deal of handling. A statistically valid sub-sample might be the best approach for effectively sampling the catches after total weight is determined, except

for sea turtles numbers (which is expected to be low). Nets will be exchanged every 5 tows.

Catch comparison information will yield information on the number of species captured, total weight of the catch, total weight of the target catch; size and weight of a representative subset of individual fish and/or shellfish and crustaceans; and other trawl performance observations (amount of debris and clogging), and environmental data (ie. sea conditions, bottom type, water temperature, and depth).

The data will be collected and analyzed using appropriate statistical methods (parametric and non-parametric; for low number of samples, a randomization test may be required).A review paper will be prepared and peer-reviewed, and presented to the appropriate stakeholders.

Education and Outreach

During the next two year period there is a continued need to conduct education and outreach with all the stakeholders:

- Technical support is critical for the acceptance and continued use of TEDs and other bycatch reduction devices. This can be a combined approach with existing gear technologists in country and outside gear technologists experienced with using TEDs. There should be an effort to continue training in-country expertise to further support this effort in the long term.

- Educational efforts should include other methods for reducing bycatch such as MPA's, closed areas, zoning, community based management and other techniques.

- The need for continued dialogue between the sectors is also important for designing appropriate BRDs , reducing conflicts between the sectors and developing a shared vision for sustainable fisheries. The Fisheries Division is setting up forums where stakeholders will come together to discuss issues.

- The use of the closed period to further assess the state of the fishery resources and critical habitat in Tanzania should be encouraged.

Other Observations

It is further suggested that a broader approach be used to look at the goals of fisheries management, taking into account the larger challenges to sustainability that Tanzania is facing that these BRDs will not solve. The widespread lack of adherence to existing regulations and the subsequent lack of enforcement will hinder any advances forward towards sustainability. The development of alternative livelihoods such as ecotourism and other activities may help alleviate the dependence on diminishing fishery resources. Education on the use of destructive fishing practices (dynamite fishing, small mesh beach seines and fish weirs) will only be effective if livelihoods are stabilized.

Specifically in the shrimp fishery, some of the regulations seem contradictory to sustainable practices such as

- Prohibition on trawling at night has led to the use of heavier sweeps to dig up the some of the valuable shrimp product that has buried up in the daytime. The heavier sweeps can have negative impacts on the bottom habitat.

- The maximum 2 net requirement from an efficiency standpoint in shrimp production is requiring them to be inefficient. The trawl vessel captains must retain fish catch in addition to shrimp catch for economic reasons as well.

- The prohibition of the use of a tickler chain is assumed to result in lower shrimp catches. Also without a chain, the net must tend bottom which will result in damage to the net itself.

Time Line:

1. Workshop report is presented to Fisheries. (March 30, 2008)
2. Fisheries approves work plan that involves TCMP facilitation
3. Pilot trials commence (March 2008). Outreach and educational activities continue.
4. Joint full proposal developed (TCMP/TIFPA,TAFIRI, MNRTF, private sector) and submitted for funding.
    1. First draft of research proposal due March 30, 2008
    2. Final Draft due July 1, 2008
5. Start full research and outreach in Mar 2009.

Annexes

Annex 1 - Workshop Participants Day 1&2

Participants of Trawl Workshop, Day 1

1	Katherine Snyder	Sand County Foundation
2	Kirk Hart	Sea Sense
3	Brandy Hussey	TCMP
4	Kessy Abdallah	CCC Bagamoyo
5	Sandey Nundwe	TCMP
6	Dr Charles Mahika	Tanzania Fisheries Research Institute (TAFIRI)
7	Dr. Benjamin Ngatunga	Tanzania Fisheries Research Institute (TAFIRI)
8	Mr. Lazaro Nhwani	Tanzania Industrial Fishing and Processing Association (TIFPA)
9	Jonce Mkuchu	Ministry of Natural Resources and Tourism, Fisheries Division
10	William Ndagira	Ministry of Natural Resources and Tourism, Fisheries Division
11	Mwanaidi Mlolwa	Ministry of Natural Resources and Tourism, Fisheries Division
12	Baraka Kalangahe	TCMP
13	Merisia Sebastian	Ministry of Natural Resources and Tourism, Fisheries Division
14	Japhet Mwampulo	Ministry of Natural Resources and Tourism, Fisheries Division
15	Nathaniel Mboje	Ministry of Natural Resources and Tourism, Fisheries Division
16	Catherine Mwakosya	Tanzania Fisheries Research Institute (TAFIRI)
17	Capt Damian Chandu	Mbegani Fisheries Development Centre- Bagamoyo
18	Abubakar Mposo	ICM Facilitator, Fisheries Officer, Bagamoyo District
19	Rashid Hoza	Ministry of Natural Resources and Tourism, Fisheries Division
20	Fatma Sobo	Ministry of Natural Resources and Tourism, Fisheries Division
21	Hakimu Davis Matola	Tanzania Fisheries Research Institute (TAFIRI)
22	Dr. Amani Ngusaru	WWF – EAME Leader
23	Anthony Dadu	Ministry of Natural Resources and Tourism, Fisheries Division
24	Ernest Bupamba	Capt. Fisheries H/Q
25	Dr. Yohana Budeba	Acting Director General. TAFIRI
26	Shahadadi Omari	CCC Bagamoyo
27	Catherine Muir	Sea Sense
28	Mr. Baget	TIFPA
29	J.M. Daffa	TCMP

Participants of Trawl Workshop Day 2

1	Katherine Snyder	Sand County Foundation
2	Kirk Hart	Sea Sense
3	Brandy Hussey	TCMP
4	Kessy Abdallah	CCC Bagamoyo
5	Sandey Nundwe	TCMP
6	Dr Charles Mahika	Tanzania Fisheries Research Institute (TAFIRI)
7	Dr. Benjamin Ngatunga	Tanzania Fisheries Research Institute (TAFIRI)
8	Mr. Lazaro Nhwani	Tanzania Industrial Fishing and Processing Association (TIFPA)
9	Jonce Mkuchu	Ministry of Natural Resources and Tourism, Fisheries Division
10	William Ndagira	Ministry of Natural Resources and Tourism, Fisheries Division
11	Baraka Kalangahe	TCMP
12	Merisia Sebastian	Ministry of Natural Resources and Tourism, Fisheries Division
13	Japhet Mwampulo	Ministry of Natural Resources and Tourism, Fisheries Division
14	Nathaniel Mboje	Ministry of Natural Resources and Tourism, Fisheries Division
15	Catherine Mwakosya	Tanzania Fisheries Research Institute (TAFIRI)
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24	Dr. Yohana Budeba	Acting Director General. TAFIRI
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Annex 2 - Workshop Objectives and Schedule

Trawl Fisheries Workshop
on
Turtle Excluder Devices (TEDs) and Bycatch Reduction (BRDs) Devices

February 5 - 6, 2008
Dar es Salaam Conference Center

Objectives:

4. Introduce TED and BRD technologies to the trawling industry and other local stakeholders: how they work and their impacts.
5. Indentify suitable TED/BRD designs that would be most applicable for Tanzania.
6. Develop a collaborative applied research design and plan for testing a TED and/or BRD design appropriate to the Tanzanian context which can assess suitability to the local fishing context.

February 5 Day 1 Detailed schedule

8:30-9:00 Opening
9:00-9:20 Introductions and workshop overview
9:20- 10:40 Current innovations to trawl gear technology to reduce bycatch
10:40-11:00 Break
11:00-1:00 Introduce the TED/BRD technology – history
- Types of TEDs and BRDs, (soft versus hard)
- Initial mistakes made in US with TED introductions and progress since
- Presentations and UW videos of trawl nets with TEDs and BRDs

1:00-2:00 Lunch
2:00 PM Continuation of TED/BRD presentation
- Future directions for fisheries extension and research for Mbagani Fisheries Development Centre
- Hands on regarding net designs, construction and brainstorming ideas about TED/BRD designs

4:30 PM Adjourn

February 6 Day 2 Detailed Schedule

8:30 AM Continue discussions and brainstorming on net designs
Research design and pilot program planning to address:

- No impact on target species of catch
- Cost implications
- Fish bycatch reduction potential
- How to obtain evidence they exclude turtles and possibility of using video technology
- Criteria for meeting US certification
- Set up training on TED/BRD construction, repair, operation
- Roles and responsibilities, resource contributions (staff and funding)
- Timeline and budget

1:00-2:00 Lunch
2:00-4:30 PM See shrimp nets at Bahari Foods Company