FAD Trials in East Africa

FMSP R8331

Annex 3

Tanzania FAD Programme

Guidelines:

No. 1 - Equipment Import and Logistics
No. 2 - Site Surveys
No. 3 - FAD Design
No. 4 - FAD Deployment
No. 5 - FAD Fishing Gears

Tanzania FADs Programme

Guideline No. 1 - Equipment Import and Logistics

The purpose of this guideline is to summarize the key issues related to the logistics of ordering, purchasing and importing FADs equipment into Tanzania, East Africa. Although ideally materials would be sourced from within the country, in practice obtaining the often high-specification FAD equipment is not possible in East Africa, thus FAD programmes require extensive lead-in periods for equipment to be sourced, ordered and then imported - ideally a minimum of three months is advised. Port charges and clearing agent fees must be included into FAD Programme budgets.

1. To start the import process an **Import Declaration Form (IDF)** must be purchased from importer's company bank, although agents can complete the IDF. Cost of an IDF varies by country but in Tanzania it is currently 1.2% of the Free on Board (FOB) value (regardless of the FOB value). To purchase and complete the IDF some detailed information from the supplier is required, therefore a preliminary order and **Proforma Invoice** is needed from supplier. Information required are:

- Specification and description of quantity/quality of equipment;
- FOB value;
- Freight Value (if applicable);
- Customs harmonised commodity code; currency of payment;
- Mode of transportation;
- Goods country of origin;
- A proforma invoice (the number should be the same as the Final Invoice).

2. On completion of the IDF it mist be submitted back to the bank, along with any proforma invoices. It is recommended that the IDF is submitted **at least 10 working days** prior to the goods arrival into Tanzania to avoid delays.

3. COTECNA/TISCAN (a registered subsidiary of COTECNA in Tanzania) collects IDFs from banks on a daily basis.

4. COTECNA/TISCAN issues/transmits Inspection Orders to COTECNA offices in charge of respective countries of export.

5. Upon receipt of an Inspection Order from COTECNA/TISCAN, the COTECNA office in charge of the country of export sends exporters a **Request for Information (RFI)**. The exporters must complete and return the RFI as soon as possible.

6. Exporters must provide the **final documentation** (final invoice, shipping documents and the packing list) to the COTECNA office in charge of the country of export **for each shipment** to Tanzania.

7. COTECNA carries out price analysis to determine dutiable value of the goods in accordance with the Agreement on Customs Valuation (ACV), as well as Customs Tariff Classification. Information is electronically transmitted to COTECNA/ TISCAN in Tanzania.

8. In turn, COTECNA/TISCAN issues a **Provisional Classification and Valuation Report (PCVR);** this provides an opportunity to Appeal the PCVR if needed. Importers must sign and return the PCVR to COTECNA/TISCAN along with an **Application for a Single Bill of Entry (SBE)**.

9. COTECNA/TISCAN then drafts and issues a **Final Classification and Valuation Report (FCVR)** and a SBE to importers, which are both mandatory documents for Customs clearance in Tanzania. For IDFs below USD5,000 (FOB), COTECNA/TISCAN performs valuation/classification services locally and issues a **Declared Valuation and Classification Report (DCVR)** to importers.

10. All shipments are subject to the COTECNA/TISCAN **Computerised Risk Management System (CRMS)** which automatically computes a level of physical intervention/inspection to be performed by Customs.

Note: Importers must make pre-payment of all Duties and Taxes as per COTECNA/TISCAN's assessment indicated on the SBE. Pre-payment to be made at designated bank and importers can only collect original FCVR and SBE after pre-payment.

Key Experience: It is cheaper and easier to import directly from a supplier in the country of origin of the equipment rather than through an agent based in another (third) country. A FAD constitutes a type of fishing gear, which is duty-free in Tanzania. Shipments must be specified as 'House to House' to facilitate import process. Payments to suppliers are best made by Telegraphic Transfer (TT). The supplier/exporter having to declare separately the value of the equipment, the freight costs and the insurance costs and send provide a Proforma either by courier or a scanned graphic image which can be printed out.

Shipments carried by large container vessels from Asia/Europe are often transhipped to smaller vessels at Jeddah or Salala before transportation to East Africa. This can cause a delay in the arrival of equipment. If there are many vessels in port will be delays in release of equipment and payment of additional port charges are likely. Important to ensure agent has someone available to make *frequent and regular* follow-ups to expedite clearance of equipment. Customs officials may only work Monday to Friday and it may take another 14 days *after* the vessel has arrived in-country for equipment to actually be released from Customs.

Useful Websites: Dictionary of Common Trade Terms: www.exportbureau.com/dictionary.html
COTECNA (Worldwide): www.cotecna.com

Costs: Shipment cost from most parts of the world to Tanzania for a 20 foot container is approximately US$ 2,000. Clearance costs for importation into Tanzania, assuming zero import tax and using local agent, should be under US$ 2,700 per full container consignment, depending on storage fees and other Tanzania-based port and handling charges.

Tanzania FADs Programme

Guideline No. 2 - Site Surveys

The purpose of this guideline is to summarize the key issues related to selecting the correct site for placing the FADs, since generally it is very difficult and costly to change the position of a FAD once it has been deployed. The South Pacific Commission (SPC) Manual Vol. 1: Planning FAD Programmes (Anderson & Gates, 1996) is the basis for much of the guideline.

1. Pre-selection surveys

This should include discussion and site visits with the local fishers who are to benefit from the FADs, with special focus on influence of wind and currents, especially in East Africa where the few offshore fishers tend to rely on sail power. The discussions should also cover the presence of tuna, and possible customary fishing grounds or other traditional uses of the proposed sites. Information on offshore shipping and industrial fishing activities is also gathered at this stage.

Close scrutiny of relevant charts is necessary before selecting the approximate areas. Relevant UK Hydrographic charts for Tanzania include: No. 3310 Dar es Salaam to Wasin Island; No. 1032 North Mafia to Kilwa Point; No. 3308 Cabo Delgado to Fanjove Island.

2. Physical factors

a) Sea floor - The ideal situation is a flat seabed, without pinnacles where the FAD mooring rope might abrade, and lacking crevasses or canyons into which the anchor could drag under strong currents, hence submerging the FAD.

b) Depth and distance from shore - The South Pacific experience suggests that FADs function best when placed at least two miles from the nearest reef. In East Africa that will probably mean the water depth will be between 300-700 m.

c) Currents - In East Africa, currents are likely to often exceed 2 knots, thus the FADs float system will certainly submerge, at least during the SE Monsoon season when the southern East Africa Coastal Current is strongest (3-4 knots). It is unlikely that there will be many locations that do not experience such currents, thus FADs need to be designed and maintained for periodic submergence.

d) FAD spacing - There is no firm rule on spacing of FADs, though it is believed from SPC programmes that in general FADs should be set over 10 miles apart, but that where conditions (e.g. restrictions in depth and distance) require FADs to be closer together, benefits may arise from greater access by fishers and thus a reduction in possible conflict.

3. Infrastructure, experience and markets

The beneficiaries must have the means to reach the FADs, thus suitable boats, and experience in use of appropriate fishing gears to catch fish at the FADs. The product, mostly tuna, must have a ready market locally. Ideally, ice should be available to improve quality of the product.

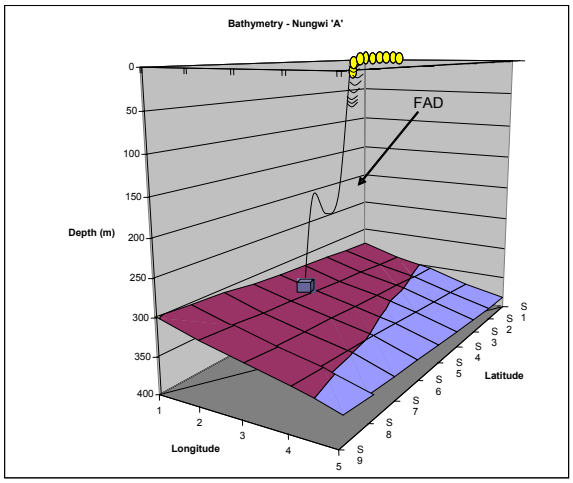
Once the approximate area for the FADs has been identified the following detailed steps are needed:

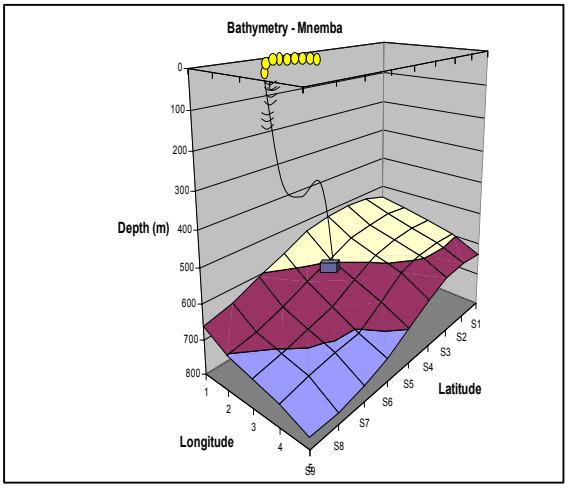
A. Site visit with local fishers - This should be done using local boats and serves also to test whether their perceptions of distance and time are correct and the proposed area really is suitable in terms of distance from shore and local access.

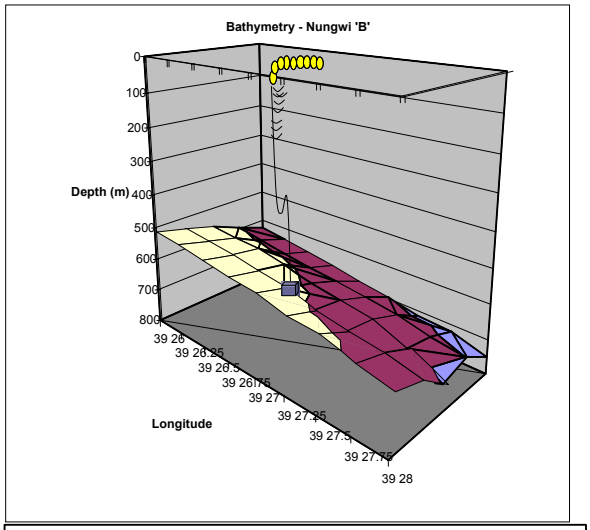
B. Detailed deepwater echo sounder survey - A deep-water sounder (model JRC NJA-1130) with a 3 KW transducer was mounted specially for the present survey and is strongly recommended. Mounting of the sounder depends on the hull design of the survey vessel. A pre-drawn grid (of 2 x 2 miles) is navigated (at 4 knots), with sounder readings synchronized with the GPS, producing the 3-D charts output of the seabed (see next page). The surveys allow the precise drop site to be selected. **Cost:** Charter of suitably equipped vessel may cost US$ 1,250 - 1,500 per day but savings can be made by operating 24 hours day.

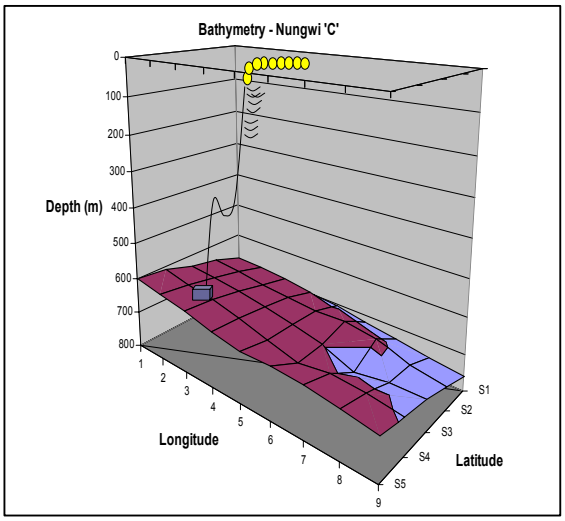
C. Agreement, support and authorization from National Authorities - FAD programmes need to be fully supported by relevant national institutions (e.g. departments of Fisheries, harbour authorities, etc.).

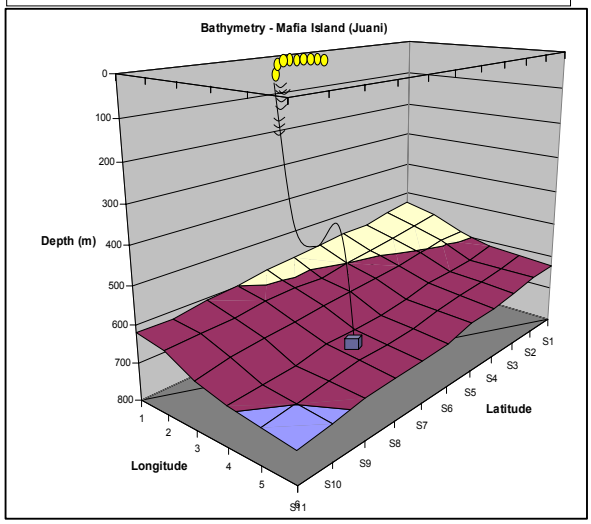
Three dimensional plots of six sites (2x2 mile grids) surveyed off the coast of northern Unguja Island (Mnemba and Nungwi) and southeastern Mafia using the methods described above.

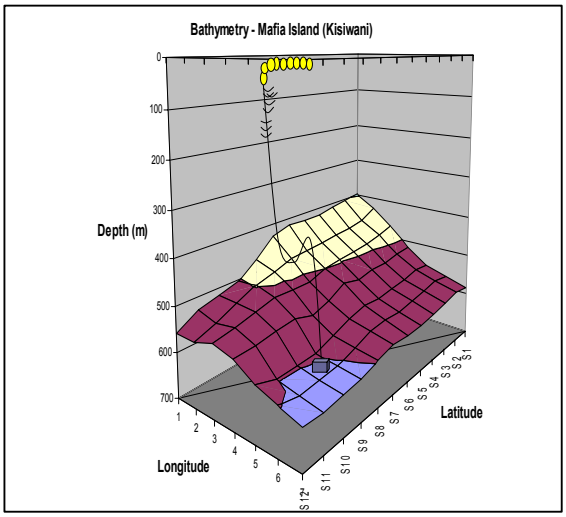










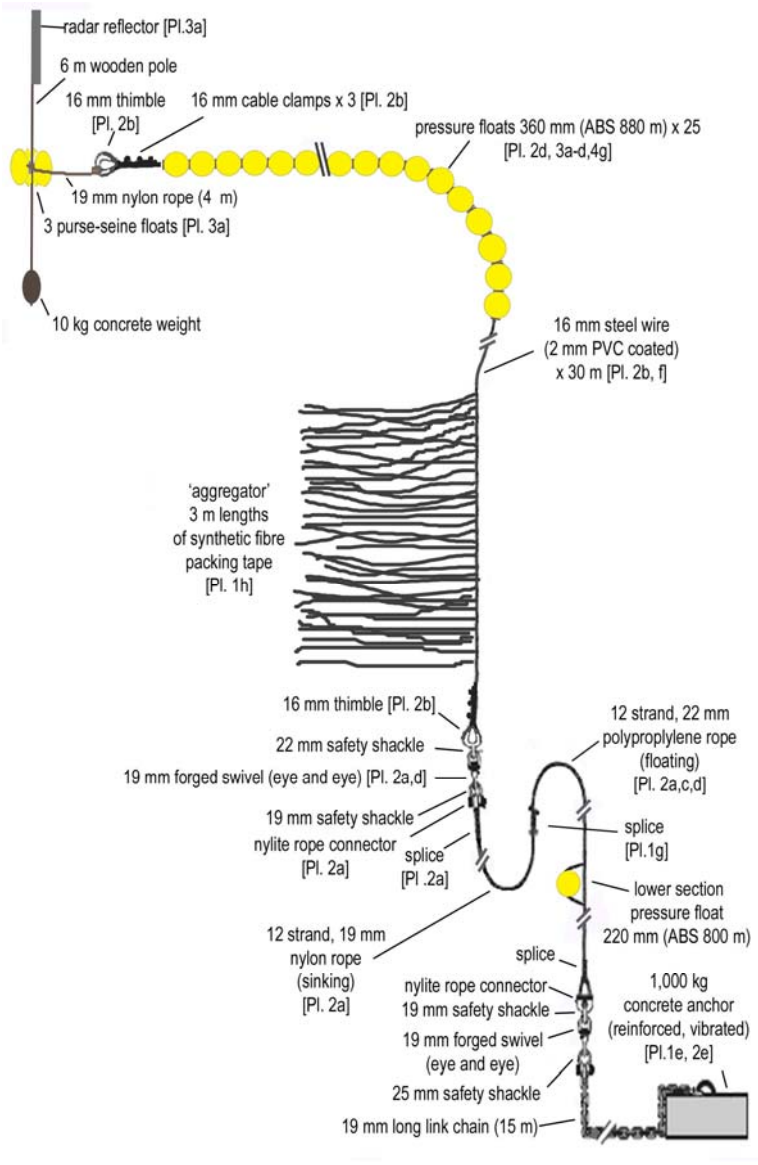


Tanzania FADs Programme

Guideline No. 3 - FAD Design

The purpose of this guideline is to summarize the key aspects related to FAD design, construction and maintenance, based on the experiences gained from the deployment of nine FADs in Tanzania. The final design used in Tanzania is illustrated below (not to scale). Although ideally materials should be sourced from within the country, in practice obtaining the high-specification materials necessary is not always the cheapest option and may not even be possible in the East Africa region. With the exception of flagpole, aggregator materials and anchors, all material were imported.

FLOAT SYSTEM - 25 plastic **pressure floats** of 20 kg buoyancy, with 40 mm centre hole rated to 800 m depth, separated by rubber spacers, along 30 m PVC-coated **steel wire** (18 mm, PCV coated (2mm)). The wire is necessary in areas where theft might be a problem, such as in East Africa.



AGGREGATOR - To the lower portion of the wire section 20-40 **PVC packaging strips** or other material (e.g. synthetic sacking, nets ropes) are attached, forming an 'aggregator' that increases surface area for growth of marine life (e.g. algae, barnacles, soft corals, etc.) which in attract small fish for shelter and increases profile of a FAD in the water column. It may be worth fixing additional 'aggregators' to the float section.

FLAGPOLE AND REFLECTOR - A 6 m flagpole (treated wood) is attached to the FAD using 16 mm nylon rope. The pole is weighted at one end and floated centrally by three purse-seine floats. To the upper portion of the poles were secured a tube-model radar reflector. The reflector was recorded on deployment ship's Radar from 5 miles. **Note**: all flagpoles were stolen from the Zanzibar FADs within a week, mainly because of the desirability of the purse-seine floats. It can be argued that there is limited value in having a flagpole, especially since the float system totally submerges periodically. During the main fishing season, temporary (sacrificial) flagpoles may be useful to assist for fishers locate the FADs, though after a few visits, fishers were able to relocate the FAD with ease.

ROPES AND CONNECTIONS - The upper section (30%) uses sinking nylon rope (19 mm, 12-strand) and the lower portion (70%) utilizes buoyant polypropylene rope (20 mm, 12-strand). Splicing 12-strand require considerable skill. Lengths of rope depend on depth, with current experiences using scope of 1.3-1.6 x water depth. Choice of 3-strand ropes or the more expensive multi-strand ropes has changed as a result of recent research in the Pacific and 3-strand rope is now seen as adequate for FAD moorings. Rope links comprise Samson *Nylite* **rope connectors** (size 3, 22 mm), **safety shackles** (with SS cotter pin, sizes 20, 22 and 25 mm) and **forged swivel** (eye and eye), 22 mm.

ANCHOR AND CHAIN - Comprises long-link chain (19 mm) and a concrete anchor of 1,000 kg (using non-marine sands and aggregate, steel-reinforced and vibrated).

FAD MAINTENANCE - Every six months FADs should be inspected. This requires a small boat and calm weather, during which the entire upper section (upper 30 m of wire, including floats, cable clamps, thimbles, swivels and nylon splice) should be inspected by commercial divers; parts should be cleaned and replaced as necessary.

COMPONENTS AND COSTS FOR CONSTRUCTION OF A SINGLE FAD

Figure	Description and material	No. /length (m)	Unit cost (US$)	Total cost (US$)
-	Flagpole Reflector Purse-seine floats	1 1 3	10.0 50.0 54.0	10.0 50.0 54.0
-	Thimble (galvanized) 16 mm	2	4.5	9.0
-	Cable clamps 16 mm	6	2.8	16.8
	Hard plastic pressure floats	25 + 1[+]	61.8	1,606.8
	Steel wire 16 mm PVC coated (2 mm)	30 m	130.0	130 .0
	Safety shackle (hdg-lcs*, with SS cotter pin)	19 mm x 2 22 mm x 1 25 mm x 1	5.2 6.9 10.5	10.4 13.8 10.5
	Forged swivel 19 mm (eye + eye)	2	5.2	10.4
	Samson *Nylite* rope connector	2	48.0	96.0
	Nylon (sinking) rope (19 mm, 12 strand)	150 m	365.9	365.9
	Polypropylene (bouyant) rope (22 mm, 12 strand)	600 m	700.0	700.0
	Long-link chain (19 mm)	15 m	320.0	320.0
	Concrete anchor	1	1	350
			Subtotal	**3,753.6**
Shipment cost - components for six FADs can be included in a 20ft container (@ US$ 2,000 shipment) thus 1/6th part thereof:				330.0
IDF form process fee (1.2%)				45.0
Clearance costs for importation into Tanzania, using local agent (@ US$ 2,700 per full container consignment) thus 1/6th part thereof:				450.0
Total cost of components, shipment and clearance of a deepwater FAD in Tanzania				**4,578.6**

* Hot-dip galvanised, low-carbon steel. [+] single float used in lower section to raise lower connection.

The above summary table of equipment (above) is reproduced courtesy of the Secretariat of the Pacific Community (Chapman *et al.,* 2005). Greater detail is available in the main document.

Suppliers - For ropes it is advised that either *Marlow Ropes UK Ltd* (www.marlowropes.com) or *Hyo Jin International Corporation* of South Korea (hyojinint@netsgo.com; www.hjint.co.kr) is contacted as they are known to be reliable and the South Korean company already has experience of supplying ropes to Tanzania. *Hyo Jin International* can also provide the majority of the remaining equipment, the centre-hole hard plastic pressure floats, shackles and swivels. It is recommended that some spare items are included in the order.

Nylite rope connectors are recommended to provide protection against abrasion and the eye-splices working free. They are produced by *Samson Rope Technologies* (SRT) based in the USA and can be ordered over the internet (www.samsonrope.com; custserv@samsonrope.com) and are delivered by airmail. *SRT* sell the rope connector (spool and shield) together with their own shackle but these shackle components are expensive and are designed for a smaller shackle-pin than a FAD requires so it is recommended that hot-dip galvanised shackles are purchased separately, for example from *Hyo Jin International*. The nylite spool will have to be drilled out to fit the new bolt-pin but using a drill press this is a simple operation.

Tanzania FADs Programme

Guideline No. 4 - FAD Deployment

The purpose of this guideline is to summarize the key issues related to the deployment of FADs in East Africa, particularly Tanzania. Recommendations from the South Pacific FADs are well documented in SPC manuals, especially Volume 3 (Gates *et al*., 1998) and are included in this guideline, combined with experiences from the Tanzania deployment of nine FADs between April 2004 and March 2005. The three main aspects of deployment that are addressed here.

Suitable vessel

Almost the single most important equipment needed is a vessel that can safely load, transport and deploy the FADs at the required sites. There exist some methods of adapting small fishing boats for deployment, but in practice, when the entire components for a single FAD can exceed 2,000 kg and occupy considerable space, the vessel needs to have adequate open deck space for assembly and controlled deployment. The Tanzania experience found that two such vessels were locally suitable and both were successfully chartered. These were:

- MT Solsky tugboat from Alpha Logistics Tanzania Ltd. (see plates a, c, d).
- MV Mafunzo training stern trawler from Mbegani Fisheries Development Centre (see plate b).


a


b

Fishing trawlers may also be suitable, of which about 30 are present, although timing is important to avoid seasons when vessels will be engaged. Other arrangements might use a barge with crane and small tugboat, depending on distances. It is important that vessels have Seaworthiness and Survey Certificates.

Deployment procedure

Once the vessel is located at the correct drop site, the FAD is ready to be deployed. The most recommended, and by far the safest method of deploying a FAD is to follow the 'anchor-last' procedure. For this, the float section is first lowered over the side of the deployment vessel (see plate c) followed by all the ropes and chain and finally the anchor is cut away or lowered into the water (plate d). This is easiest done if the vessel holds its position in the current/wind while the float section and rope drifts astern, or by navigating in a circle. The method avoids the danger of rope snagging or knotting on deck or around the feet of deployment personnel!


c


d

Deployment costs

Chartering a suitable deployment vessel is likely to be a significant cost for a FAD programme, equal to or more than the cost of a single FAD, thus it is essential that all equipment be carefully assembled and tested beforehand. Fuel costs are likely to be a major component of the charter depending on distance. The deployment events undertaken during the Tanzania FAD Programme cost between US$ 6,500-10,000 from Mbegani to all sites at Zanzibar and Mafia. If VAT exemption is possible (e.g. when contracting government agencies), savings on charter and fuel can be considerable.

Tanzania FADs Programme

Guideline No. 5 - FAD Fishing Gears



The purpose of this guideline is to summarize the key issues related to fishing gears for effective use around deepwater FADs such as the six FADs present in Tanzania. The choice of gears benefited from inputs from the Seychellois, British and Canadian master-fishermen that have participated in the Tanzania FAD trial, as well as local fishers and from the comprehensive SPC Manual (Preston *et al.*, 1998), on which the illustrations below are based.

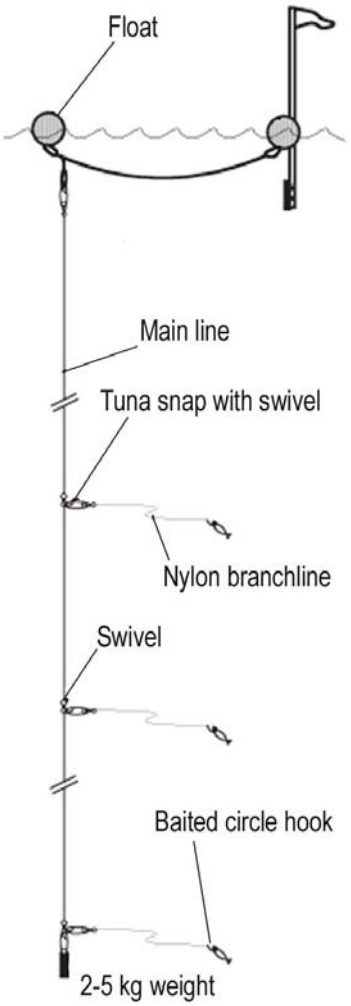
Vertical longlines

The basic arrangements of fishing gear recommended for use around FADs is based on the vertical longline for which several options and modification are possible. The two main arrangements are the hand line and drop line, but the lines can also be used for surface trolling.

- Hand line - use in 30-70 m depth, either when tied off on the FAD or drifting (see figure below).
- Drop line - for use in 60-300 m depths, free-floating.
- Trolling line - usually 3-4 rigged per vessel.

The components for equipping one vessel with longlines (for use as hand line or free floating drop lines) are listed in the table below. Prices refer to purchases from the Seychelles, with assistance of the local fisheries department, though suppliers exist in the UK and South Africa. Except for tuna snaps, most of the gear can be purchased in Tanzania, though most importers have little demand for circle hooks.

Circle hook



Items for equipping a single (4-man) fishing vessel for FAD fishing	**Quantities**	**Price** (US$)
Float - ideally hard pressure long-line float, 10 litre (or several purse seine floats), with marker buoy and flagpole preferably.	1-3 per line, 10 total	70
Mainline - braid line (4 mm, nylon, woven, 200 kg test) or polypropylene equivalent.	3 x 400 m roll	200
Tuna snaps - with swivel for attaching to branchlines.	10 per line, 30 pcs. total	75
Circle hooks - Mustad, size 13/0, or Japan tuna hook size 3.6 mm. 5-10 per line.	100 incl. spares	25
Branchlines - nylon monofilament (no. 180; 50 kg test less than mainline) 3-5 m length	100 m roll	12
Swivels (No. 5)	50	70
Subtotal (longling gears only)		452
+ Cold box (for bait)	1	40
+ Steel gaff	2	30
+ Trolling lures	10	80
Total (longling gears + additional items) US$		**602**

Fish finder

In additional to the list above an echo-sounder or fish finder is a useful piece of equipment. For the October fishing trials, a Garmin 250, with greyscale 8x8 cm display and 4000 Watt (peak to peak) transducer, was mounted on the local vessel prior to each fishing or FAD inspection trip. At a cost of about US$ 450, the sounder worked very well and is recommended, especially for determining the depth of the tuna around the FAD (not proven in the present study) and if new grounds are being sought (e.g. Mafia for demersal, vertical longline fishing).

Safety

For all fishing trials (and FAD inspections) using local vessels during the Tanzania FAD Programme, safety was an important consideration and can be increased by adopting the following measures:

- use of TWO vessels when fishing offshore
- vessels equipped with outboard engine and sail
- mandatory presence of life-jackets aboard all vessels
- use of mobile phones or radios
- first aid kit

Post harvest: care of catch

The use of ice greatly increases the condition and value of fish, especially ‘hot’ fish such as tuna. Bleeding of tuna also improves the quality of the meat by reducing the amount of blood that remains in the tissue when the fish dies.