PILOT AND SMALL-SCALE TAGGING OF TROPICAL TUNAS IN THE INDIAN OCEAN 2003 PROJECT REVISED FOR THE EUROPEAN COMMUNITY

In September 2002, a request was addressed to the DG-FISH by the Indian Ocean Tuna Commission (IOTC) for funding to support activities related to the Indian Ocean Tuna Tagging Programme (IOTTP). The background, overall objectives and strategy of implementation are covered in the documentation attached to that submission.

The overall plan of action called for a main phase was to conduct a number of pilot studies and small-scale tagging projects that would provide a solid starting point for the IOTTP. The original plan of action had to be modified during the course of the operations, as a result of unexpected circumstances.

The revised proposal include changes as detailed in the following table :

Project title	First Proposal (in €)	Proposed revision (in €)	Final revision (in €)
Projet Pilote Mayotte	3,382	3,781	3,191.07
Small-scale tagging in Mayotte	25,000	-	-
Pilot Project in Oman	-	-	4,388.74
Pilot Project in Seychelles	85,000	37,938	35,112.98
Live-bait Pilot Project in Seychelles	37,000	6,642	6,007.93
Small-scale tagging in Maldives	-	62,355	45,357.56
Simulation study of tagging requirements	22,500	15,000	15,511.57
Study on sport fishery tagging	6,000	6,000	4,958.68
Publicity and Communication	6,000	9,000	11,076.70
Tag recoveries	6,000	4,000	44.62
IOTC Tagging Assistant	24,000	21,500	17,409.92
Miscellaneous Travel	10,000	9,120	7,617.77
General tagging supplies	1,000	24,011	22,907.31
TOTAL	**225,882**	**199,347**	**173,584.54**

Explanatory Notes

Pilot project and small-scale tagging in Mayotte

The pilot project in Mayotte took place as anticipated. During this pilot study, local personnel was trained on standard tagging techniques so that they would be in a position to execute a small-scale tagging project independently.

However, staff changes during 2003 resulted in a lack of sufficient personnel at the Service des Pêche et de l'Environnement Marin in Mayotte to carry out the small-scale tagging project that has been proposed.

Pilot Project in Oman

The Pilot project in Oman was not included in the first proposal neither in the revised one but such a pilot was recommended by the working Party on Tagging to assess the feasibility and cost of tagging in Oman from non-conventional platforms such as outboard-powered artisanal fishing craft using handlines and troll fisheries and refine tagging techniques as necessary.

Oman is of particular importance for tagging yellowfin, as the fish caught in the Arabian Sea are in a size range which is not commonly caught by either the longline or the purse seine fisheries. Tagging yellowfin there could address particular questions on the growth rates at this critical size and the transfer rates of medium size yellowfin to the principal fisheries catching adult tropical tunas.

The mission took place in 2003 with a budget of 4,389 US$:

Item of expenditure	*Cost in US$*	*Cost in €*
Travel cost and fees for consultant	5,157.58	4,262.46
Tagging supplies	1,52.80	126.28
Total	5,310.38	4,388.74

No fish were tagged during this pilot mission but the potential for tagging from a bait boat appears to be very high and should be attempted in due course. Moreover, this mission permit to demonstrate that Oman could be a place to find bait for the main phase of the IOTTP.

Pilot Project in Seychelles

The pilot project in Seychelles, proposed at a cost of US$85,000, relied to a large extent on the projected availability of L'Amitié, the research vessel from the Seychelles Fishing Authority. Unfortunately, it was not been possible to secure the time-at-sea necessary to complete the intended number of cruises. Two cruises took place during which experimental fishing techniques that will be useful for the main phase of the IOTTP were tried. Problems were also encountered in that, for unknown reasons, the FADs that were initially deployed were not found in subsequent trips to the area.

Item of expenditure	*Cost in US$*	*Cost in €*
Travel cost and fees for consultants	18,018.39	14,891.23
Tagging supplies	4,689.77	3,875.84
Cost of materials for building FADs	13,552.13	11,200.11
Operating costs for the vessel (L'Amitié)	1,871.45	1,546.65
Charter of the vessel (Consolation)	4,354.96	3,599.14
Total	42,486.70	35,112.98

Live-bait project in Seychelles

The main objective of this project was to assess the feasibility of locating, capturing and maintaining a supply of livebait in the waters around the Seychelles. The availability of livebait is essential to the success of the main phase of the IOTPP, the Regional Tuna Tagging Programme (RTTP-IO), where two pole-and-line vessels will operate in the western Indian Ocean over two and half years tagging large numbers of tuna.

The full completion of this project depended also on the availability of the SFA's research vessel and the approval of a cooperation project between Seychelles and the Spanish government to provide participation of a fishing master with ample experience in the required fishing techniques. Neither of these conditions were met and, therefore, this project was not fully completed in this year.

Nevertheless, given the importance of securing a continuing supply of livebait for the success of future tagging, this project will be reformulated for next year.

Furthermore a first experiment of settle coastal FADs to concentrate bait on the Mahé plateau was implement this summer. Four coastal FADs made in bamboos and coconut leaves were anchored on the west coast of the Mahé Island. Two visits were made to these FADs to study the dynamic of the bait aggregation.

Item of expenditure	*Cost in US$*	*Cost in €*
Bibliographic research on availability of bait species	3,690.06	3,049.64
Consultancy to assess feasibility of bait holding facilities in Seychelles	2,548.39	2,106.11
Coastal FADs experiment	1,031.15	852.19
Total	7,269.60	6,007.94

Simulation studies to assess possible schedule of releases.

To maximize the expected benefits of the RTTP, a simulation study was proposed that would estimate the amount of information that could be obtained under different time and area schedules of releases of tagged fish, given the operational constraints of the pole-and-line vessels.

The revised budget for this study, to be conducted from November 2003, reflects a better estimation of actual costs, and the rescheduling of a second round of more detailed simulation studies for the following year.

Small-scale tagging in the Maldives

A small-scale project has been proposed and recommended by the Working Party on Tagging with the objective of studying potential interactions with the industrial fisheries operating in the region, and provide growth rates of yellowfin and skipjack tunas. The project, described in detail in Annex A, calls for tagging 3000 skipjack and 500 yellowfin tunas during 2004, and is based on very successful tagging projects conducted in the early 1990's in the same region.

Study on tagging from sport fisheries

This study was completed as intended and with no change in the proposed budget.

Publicity and communication

Posters in three languages publicizing the activities and the rewards of projects associated with the IOTTP were printed and distributed at the main recovery points in Victoria, Seychelles. The design of a logo and the printing of T-shirts and caps has progressed according to the initial plans. These materials will be offered as alternative rewards for reporting recaptured tagged fish.

Tag recoveries

The expenditures under this item cover the rewards paid to those who return recaptured tagged fish. However, the number of tagged fish released was less than originally anticipated, due to the cancellation of the Mayotte small-scale tagging and the partial completion of the pilot project in Seychelles. This component of the budget has therefore adjusted accordingly.

IOTC Tagging Assistant

Since April 2003, M. Julien Million, provided logistic support for the various activities of the ongoing tagging projects. This budget component covered the cost of travel and salary over the period that M Million's worked with the Secretariat.

Miscellaneous travel costs

The expenditures under this item cover: 1) the costs of the participation of three experts from Maldives to the Working Party on Tagging, to finalize the proposal for the small-scale tagging in Maldives; 2) the costs of a consultancy to Oman to assess feasibility of tagging from artisanal fisheries, and 3) travel expenses of a tagging

expert to Mayotte to film tagging procedures.

General tagging supplies

Different types of material have been purchased throughout the year to provide support to the activities of the pilot and small-scale projects. Most of these supplies will be utilized in subsequent years. These include conventional tags and electronic computer equipment to be used solely for the listed projects. Bulk purchases of conventional tags has allowed to reduce the costs of some of the listed projects. Other changes in requested funds reflect actual spending incurred.

Item of expenditure	*Cost in US$*	*Cost in €*
Digital video camera	1,639.40	1,354.88
Plastic dart Tags	22,782.20	18,828.26
Computer equipment	3,296.25	2,724.17
Total	27,717.85	22,907.31

Annex A. Proposal for a small-scale tagging project in the Republic of Maldives

Background

The Republic of Maldives has a long history of fishing for tunas that goes back several centuries ago. Despite the spectacular growth of the tourism sector, fishing is still the major economic activity carried out on the outer islands. The sector still employs about 10% the working population and is currently valued at 50-60 million US$ a year.

Tuna fishing in the Maldives is by livebait pole-and-line method and the fishery is still essentially a coastal one. But given that tunas are considered to be highly migratory, Maldives is aware that sustainable development of local fishery requires increased knowledge about the status of the Indian Ocean tuna stocks. To this end the Marine Research Centre of Ministry of Fisheries, Agriculture and Marine Resources has conducted two successful tagging programmes in the 1990s. The first programme was conducted in 1991 with assistance from the now defunct (and taken over the Indian Ocean Tuna Commission) IPTP and the second during 1993-1995 under the IDA/ World Bank's Technical Assistance Programme. In total some 17,000 skipjack and yellowfin tuna were released and nearly 15% of the releases were recovered. The data form these programmes have been analysed extensively and have provided important contribution to the scientific understanding of skipjack tuna in the central Indian Ocean.

One major drawback in the previous tagging programmes was that releases occurred only in the local fishery. Therefore, it was not possible to quantify the interaction between the local fishery and the rest of the Indian Ocean's. Also the effort gone into recovering the tags from the overseas fisheries was probably not sufficient to have obtained a reasonable recovery rate. In order to fully study the fishery interaction simultaneous release of tags from all the fisheries would be necessary and recovery efforts should be equally high in all the fisheries.

The Indian Ocean Tuna Tagging programme (IOTTP) offers a unique opportunity to conduct such simultaneous experiments that should shed more light on the relation between the resources in Maldives and the rest of the Indian Ocean. The current document proposes to complement the activities of the IOTTP with a component of tagging in Maldives at a fraction of the cost of the main phase of the programme.

The assessment of interactions is not the only objective covered by this proposal. Tagging from Maldives will contribute to several of the objectives of the IOTTP, such as an improved estimation of growth rates for tunas, local exploitation rates, and, obviously, an improved knowledge about the exchange rates between the different areas of the Indian Ocean.

Summary description of the project

The proposed project is based on the experiences from previous two experiments. The tagging platform remains the traditional dhoni vessels. This fleet has undergone a remarkable transformation towards larger, more efficient vessels, virtually all of them now in the 75-90 ft size range. They are all fitted with GPS, many of them with echosounding equipment and some with bird radars. Releases and the eventual recoveries can be better located thanks to the positioning equipment. More deck space provides for safer operations. All these developments mean that the vessels will provide an even more efficient platform that in previous experiments.

Fishing techniques have changed to some extent as the boats now catch bait in the early morning hours with the help of lights, allowing them to be back to the base port before noontime.

As it was done before, rather than chartering the vessel, the tagging team will be on board during a regular fishing trip and fishermen will be paid a price per tagged fish that exceeds the regular market price to provide a financial incentive. A price differential will be paid for yellowfin tuna as to provide an additional incentive and to reflect different market prices for that species.

The tagging rate is expected to be about 100 fish tagged per day, which a conservative estimate, considering past experience. In this calculation, the number of days including the days used for travel to and from the tagging sites.

The proposal anticipates that two tagging teams of three taggers each will be deployed in the field. This, together with the anticipated tagging rate of 100 fish/day, results in the total estimate of 210 man/days field work, equivalent to a total of 35 days of field work to complete the release experiment.

The tagging period anticipated covers the main fishing seasons, especially during the northeast monsoon between November 2003 and April 2004. This could be complemented by some tagging during the southwest monsoon between June-August 2004, if the targets have not been met in the northeast monsoon season. The intended area of tagging is the area west of the northern atolls. The choice of the season and areas is consistent with the main objective being the estimation of exchange rates with the western Indian Ocean.

Special emphasis was placed on provide attractive rewards for tags returned. In particular, the proposal contemplates the release of a number of double-tagged fish to complete to estimate tag-shedding rates. This of particular importance as most of the personnel in the tagging teams will have little or no previous experience in tagging. A premium reward is to be paid when the whole fish is returned. This is to minimize to the extent possible length-at-recovery measurement errors, which complicate the estimation of growth rates from tagging data.

The Marine Research Center, under the Ministry of Fisheries, Agriculture and Marine Resources, will be the institution responsible for the execution of the project. A small component for training of new personnel has been added to the budget. Training requested covers not only field techniques but also facilities to produce fast reports to the fishermen returning tags on the history of the tag returned.

On the publicity campaign side, the MRC will be in charge of translating, printing and distributing the posters offering rewards for returned fish. The MRC produces a popular programme for TV Maldives, which would be an excellent vehicle to communicate the objectives as well as the progress of the programme, therefore ensuring a high return rate from a motivated community. It would provide an opportunity for emphasizing the importance of returning tags with full information including an accurate measurement of the fish.

This project would complement the information obtained from the tagging proposed from the Lakshadweep Islands and could also be supplemented by a pilot proposal to conduct tagging of large yellowfin tuna from the handline fishery near Male.

PROPOSED BUDGET

A: Payment for Tagged Fish	Recovery	Qty	cost	Unit Total (US$)
Skipjack tuna < 65 cm FL		3,500	5.0	17,500.00
Yellowfin tuna < 100 cm FL		500	8.0	4,000.00
Total		**4,000**		**21,500.00**
B: Rewards (20% recovery rate assumed)				
Tags with information (full or partial)	70%	560	13	7,280.00
Whole tagged fish returned	30%	240	21	5,040.00
Lottery on Fisherman's Day				1,500.00
TOTAL		**800**		**13,820.00**
C: Equipment				
Measuring boards (to be fabricated in the Maldives)		10	30	300.00
GPS (Garmin GPS65)		3	250	750.00
Measuring tapes for the islands		200	0.9	180.00
Tagging cradles (to be fabricated in the Maldives)		3	300	900.00
Yellow PDT darts tags for normal size fish*		5000	0.39	0.00
Applicators for PDT tags*		150	3.8	0.00
Applicator sleeves		5	15	75.00
Computer (laptop)		1	2500	2,500.00
Digital camera		1	1000	1,000.00
Printing recovery forms (envelopes)		5000	0.038	190.00
Re-sealable plastic bags for recovery kit		2000	0.13	260.00
Pencils for the recovery kit		2000	0.1	200.00
TOTAL				**6,355.00**
D: Publicity				
Posters (1000 x Divehi)		1000	3	3,000.00
T-Shirts (with poster printed on back)		400	6	2,400.00
Caps		100	12	1,200.00
TOTAL				**6,600.00**
E: Field Expenses				
Return airfare to Hanimaadhoo (local airport, 12 tickets)			75	900.00
Vessel hire from airport to fishing islands (10 days)			200	2,000.00
Accommodation at the islands				2,500.00
Field allowance for MRC staff (man days)		100	20	2,000.00
Miscellaneous				2,000.00
TOTAL				**9,400.00**
E: Contingency				
10% of A, B, and E				4,680.00
TOTAL				**4,680.00**
GRAND TOTAL				**62,355.00**

***IOTC will provide these**