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ПРОГРАММА ОРГАНИЗАЦИИ ОБЪЕДИНЕННЫХ НАЦИЙ ПО ОКРУЖАЮЩЕЙ СРЕДЕ

Mid-Term Review of the UNEP/GEF project Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of By-catch Reduction Technologies and Change of Management

Project Number UNEP GF/2731-02-4469 & GF/4030-02-04

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Introduction

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ii. The main objective of the project is to reduce discards in tropical shrimp trawl fisheries by introducing appropriate fishing technologies. The project objectives also include the reduction of overall by-catch by shrimp trawlers, in particular the capture of juveniles of commercially valuable species, and a better understanding of the impact of shrimp trawling on marine habitats.

Overall findings

Project design

iii. While the project document contains a considerable amount of information, it is not as clear and concise as it could have been. This is particularly true for the logical framework (logframe), which appears to lack some of the logic that generally governs this type of planning tool.

iv. The overall project objective – to reduce discards and by-catch – is found to be of continued relevance to participating countries. However, with regard to objective number three, 'Increase knowledge of the impact of shrimp-trawling on marine habitat' – intending in particular the investigation of damage on the bottom habitat by trawling – it is felt that the inclusion of this objective in the project may have been an overly ambitious undertaking considering the overall focus of the project, its level of funding and time frame as well as the capacities of the participating countries.

Major achievements and strengths

v. Overall, the project has made important progress towards the objective of reducing discards and by-catch although there are differences in progress among countries. In spite of a relatively slow start due to administrative problems at project inception, substantial results have been produced with regard to data collection, and testing and demonstration of BRD devices and improved gear. Although only a few countries can show concrete results with regard to the wider implementation of the defined/developed BRDs and gear or towards the formal legalisation their use, most are likely to have made further progress at the end of the project. Outputs produced so far include:

- Tests on BRDs and decision on what devices should be promoted/recommended for regulations completed for some fisheries (e.g. in Calbayog in the Philippines, Colombia, Pacific coast of Mexico, etc) and trials well under way in most other countries. Probable by-catch reductions estimated to be around 30-40 percent.
- Revised or new legislation adopted in Nigeria and Mexico, and work started on legal reviews in others. Recertification of Nigeria for shrimp exports to the USA by reintroduction of TEDs (to be confirmed officially).

- Recognition of the need for a wider fisheries management approach reinforced, including, for example, effort controls through closed seasons/areas and limits on number of trawlers.
- Extensive technical regional (and global) collaboration established and cooperation initialised and steps taken towards harmonisation of by-catch reduction at sub-regional level (Nigeria/Cameroon/Gulf of Guinea countries, Mexico/Latin America and the Caribbean, SEAFDEC/Southeast Asia).
- Knowledge of by-catches – composition and quantities – improved and further information currently being collected on the socio-economic role of by-catches (Nigeria, and Trinidad and Tobago).
- Cooperation between governments (officials and researchers) and the shrimp trawl industry / private sector established, or strengthened in countries where it existed pre-project.
- Awareness of the importance and usefulness of BRDs and the knowledge of possible technical solutions enhanced among relevant national institutions and administrations as well as within the fishing industry.
- An FAO manual/guide on BRDs published ('A Guide to Bycatch Reduction in Tropical Shrimp-Trawl Fisheries'), training materials on Juvenile and Trashfish Excluder Devices (JTEDs) developed (by SEAFDEC) and set-up of a project website.

vi. The strengths of the project include its close cooperation with the private sector and trawl industry, and the regional and international cooperation. Moreover, the pragmatic and hands-on technological approach of the project has served as an important entry point for wider management discussions with the private industry and other stakeholders

Weaknesses

vii. With regard to likely end-of-project achievements, there are important differences between the countries where by-catch is utilised and carries a commercial value and those where by-catch is generally not wanted and discarded. The project is likely to be more successful in the Latin American (and Middle East) regions than in the countries in Southeast Asia and Africa. This argument is based on the assumption that enforcement of regulations will be difficult and that the voluntary cooperation of the industry is essential. Moreover, where by-catch is being used, it often plays an important role in food security for poorer population groups and this situation needs to be better understood.

viii. While industry cooperation is strong and a fundamental basis for a successful introduction of BRDs, there is also a need to formalise their utilisation. The project addresses the need of legislative revisions but the next step – to enforce the revised or new regulations – is relatively poorly addressed. It would also be important that the application of BRDs is combined with other management tools and that a holistic approach to safeguarding the sustainability of shrimp trawl fisheries is taken.

ix. Changes take a long time and results can generally not be rushed. Applying a participatory and partnership approach requires time and patience and this has to be accepted for good results to be achieved. A project duration of five or six years may not be sufficient to optimise the impact of project results and to ensure full sustainability.

x. The project is based on the assumption that a reduction of by-catches has a positive impact on the ecosystem. While the validity of this assumption is not questioned, there is a need to review and document how the project results impact on ecosystem conditions. A process for documenting the results of the technical trials carried out and lessons learnt appears to be lacking.

Main recommendations

xi. For the remaining part of the current project, the following is suggested:

- The success indicators and end-of-project targets need to be revised to allow for monitoring of results.

- Baseline data will be needed to demonstrate the project's role in achieving the targets and such baseline information should be documented together with the revised indicators.
- Work plans for the remaining time of the project should be reviewed at both the national and the global levels and updated with appropriate detail, including milestones for close monitoring of progress.
- The overall project approach based on close cooperation with the industry should be continued and further strengthened.
- During the remaining part of the project, results should be consolidated and efforts made in particular to ensure that the necessary legislative enactment takes place.
- Additional visibility of FAO/UNEP in project countries could play an important role in soliciting support from higher national political levels for new policies and regulations and should be ensured.
- Efforts should be made to review and document the results achieved by the project and analyse their importance in relation to the environment and ecosystems.
- While it would be possible to partially address project objective number 3, 'Increase knowledge of the impact of shrimp-trawling on marine habitat', by carrying out a (desk) study, the reviewer is uncertain as to whether this would be a worthwhile effort.
- The project website requires some attention and updating. However, information from the project may be more useful and accessible if included on a wider shrimp trawl or by-catch website that could be set up by FAO.
- A number of high quality articles/reports should be published by the project in journals as well as in the FAO Fisheries Technical Report series (or similar).
- The project could also consider organising an international end-of-project technical seminar or conference in which results and achievements are presented.
- Exit strategies – i.e. post-project follow-up activities to ensure sustainability of results – at national and global levels need to be developed with some urgency.

xii. It is strongly recommended that a new project is formulated and implemented in order to benefit from the momentum created by the achievements of the current project. This would allow to follow-up on existing activities and also introduce a broader scope addressing other management issues and approaches. Moreover, additional countries should be invited to participate in the project and further regional cooperation and technological transfers between countries encouraged.

xiii. Such a project needs to be formulated with some urgency to ensure continuation. The design process should be participatory – using the mechanisms for stakeholder consultations already established in the countries participating in the current project and creating similar procedures in new countries – and allow for sub-regional and country specific activities under an overall umbrella of improved management of tropical shrimp trawl fisheries.

ACRONYMS AND ABBREVIATIONS

BRD	By-catch Reduction Device
CONAPESCA	*Comision Nacional de Aquacultura y Pesca* (Mexico)
FAO	Food and Agriculture Organization of the United Nations
FDF	Department of Fisheries of the Federal Ministry of Agriculture and Rural Development (Nigeria)
FIIT	Fishing Technology Service (FAO)
GAPCM	*Groupement des Aquaculteurs et Pêcheurs de Crevettes de Madagascar*
GEF	Global Environment Facility
INP	National Institute of Fisheries (*Instituto Nacional de la Pesca* – Mexico)
JTED	Juvenile and Trash fish Excluder Device
LME	Large Marine Ecosystems
LOA	Letter of Agreement
Logframe	Logical Framework (part of project document)
MCS	Monitoring, Control and Surveillance
MPA	Marine Protected Area
MSC	Marine Stewardship Council
NC	(Project) National Coordinator
NIOMAR	Nigerian Institute for Oceanography and Marine Research
NITOA	Nigerian Trawler Owners' Association
NOAA	National Oceanic and Atmospheric Administration (USA)
NPSC	National Project Steering Committee
OLDEPESCA	*Organización Latinoamericana de Desarrollo Pesquero*
REBYC-project	Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of By-catch Reduction Technologies and Change of Management project
RFB	Regional Fishery Body
SEAFDEC	Southeast Asian Fisheries Development Center
TED	Turtle Excluder Device
TTFD	Thai Turtle Free Device
UNEP	United National Environment Programme
US, USA	United States of America
VMS	Vessel Monitoring System
WWF	World Wide Fund for Nature

GLOSSARY

Artisanal fishery
Traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amount of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption. In practice, definition varies between countries, e.g. from gleaning or a one-man canoe in poor developing countries, to more than 20 metre trawlers, seiners, or long-liners in developed ones. Artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export. Sometimes referred to as small-scale fisheries

By-catch
Part of the catch taken incidentally to the target species toward which fishing effort is directed. It includes all non-target animals and non-living material, including those that escape from the fishing gear during the fishing operation and are not landed on board.

By-catch reduction device (BRD)
Any modification to a trawl designed to reduce the capture of by-catch. Strictly speaking a TED is a type of BRD that excludes turtles and other large animals from the trawl although the term BRD generally refers to a device that is specifically designed to reduce the capture of fish by-catch and other small animals and debris. Other modifications that may reduce by-catch include larger meshes in the main body of the trawl, ground gear modifications or headline height adjustment.

Discards
The part of the catch released or returned to the sea, dead or alive, whether or not such fish are brought fully on board a fishing vessel.

Fishing industry
Includes both recreational, subsistence and commercial fishing, and the harvesting, processing, and marketing sectors. *In this report, however, the term 'industry' is generally used for the large-scale shrimp trawl fleet (the 'industrial' sub-sector as opposed to the artisanal fishery) which is the main target of project activities.*

Monitoring, Control and Surveillance (MCS)
Activities undertaken by the fishery enforcement system to ensure compliance with fishery regulations.

Selectivity / selective fishing gear
Ability to target and capture fish by size and species during the fishing operation while allowing by-catch to escape unharmed / a fishing gear allowing fishers to capture few – if any – species other than the target species.

Target species
Those species that are primarily sought by fishers in a particular fishery, i.e. the subject of directed fishing effort in a fishery.

TED
A term that initially meant turtle excluder device but now sometimes also refers to trawl efficiency device, i.e. a grid or net panel preventing large animals from entering the codend. TEDs not only exclude turtles but also sharks, stingrays, jellyfish, sponges and large fish.

Trawl
A cone or funnel-shaped net that is towed through the water by one or more vessels.

Sources: Eayrs, S. (2005). A Guide to Bycatch Reduction in Tropical Shrimp-Trawl Fisheries. FAO, Rome, Italy, and FAO Fisheries Glossary at http://www.fao.org/fi/glossary.

1 INTRODUCTION

This Report

1. This report presents the findings and recommendations of the mid-term review – carried out in October-December 2006 – of the global project *Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of By-catch Reduction Technologies and Change of Management* (*the REBYC-project*). The project has a total budget of US$9 150 000 and a duration of six years (June 2002-June 2008). It is implemented by the United Nations Environment Programme (UNEP), executed by the Fisheries Department of the Food and Agriculture Organisation of the United Nations (FAO) and co-funded by the Global Environment Facility (GEF), FAO, the Southeast Asian Fisheries Development Center (SEAFDEC) and the twelve participating countries.

The Project

Project Background and Rationale

2. Bycatches, i.e. catch taken in addition to the targeted fish, constitute an important part of the total catch of the world's fisheries. Shrimp fishing, and in particular tropical shrimp trawling, produces large amounts of by-catch. Some of the by-catch may be retained and landed. Another part is usually discarded, i.e. returned to the sea. Discards usually constitute dead fish (or turtles, dolphins or other unwanted catch).

3. By-catches impact on the ecosystem by increasing the mortality of the incidentally captured species. By-catches are generally unregulated and may pose a threat to species diversity and to endangered species, e.g. sea turtles, and to the balance and health of the ecosystem. By-catches, when consisting of juveniles of commercially valuable species and food fish, also have an economic impact by sub-optimal use of the fishery resources and hence constitute a threat to food security and sustainable fisheries. Moreover, unwanted by-catches incur costs related to sorting and handling of catch.

4. In addition to producing large amounts of by-catch, shrimp trawling also affects the ecosystem by its physical impact on seabeds and bottom habitats. The extent of this impact varies between fisheries and fishing grounds. However, the knowledge of how towed fishing gear impacts different types of habitats is still only rudimentary.

5. The reduction of by-catches and the impact of shrimp trawling on marine ecosystems and habitats has become a policy of many countries, and regional and international organisations. Considerable efforts have been made in recent years to modify fishing gear and practices in this respect and there is growing pressure on the industry to change their practices accordingly.

6. Although the use of certain by-catch reduction devices (BRDs) are mandatory in some tropical shrimp fisheries, i.e. the turtle excluder device (TED) required for shrimp exports to the United States, better technologies and practices could be introduced and the level of compliance improved. This situation was confirmed by the results of baseline studies carried out in thirteen countries as part of the preparatory phase of the REBYC-project. These baseline studies also showed the complexity of the by-catch problem and identified both important differences and similarities among countries and fisheries in the four main tropical regions involved, i.e. Latin America and the Caribbean, West Africa, the Middle East and Southeast Asia. The conclusions of the studies were discussed in national and regional workshops.

7. Based on this preparatory work, the REBYC-project was formulated to address the issue of by-catch and environmental impact by tropical shrimp fisheries in a selected number of countries according to

their priorities. The main mechanisms to be used were cooperation among participating national institutions, utilisation of experiences from countries outside the tropical regions having developed more advanced technical solutions and technical support from FAO.

Project Objectives, Expected Outcomes and Approach

8. The main objective of the REBYC-project is to reduce discards in tropical shrimp trawl fisheries by introducing appropriate fishing technologies. The project objectives also include the reduction of overall by-catch by shrimp trawlers, in particular the capture of juveniles of commercially valuable species, and a better understanding of the impact of shrimp trawling on marine habitats.

9. The project logical framework (logframe) includes five outcomes and four results:

Outcomes:	*Results:*
1. Minimizing the pantropical problem of unwanted by-catch from shrimp trawling	1. Adoption of by-catch reduction devices by national and regional shrimp-trawling fisheries
2. Introduction of appropriate fishing technology and practice	2. Improved management of shrimp-trawling fishery
	3. Increased co-operation among countries in research on and management of the resources
3. Enactment of relevant legislation and development of an improved management framework	4. Better understanding of the interactions between fishing gear and environment
4. Enhance awareness of the problem of shrimp by-catch	
5. Increase dialogue, interaction and joint operations at the country and regional levels	

10. The project approach is based on "the introduction of appropriate fishing technologies (by-catch reduction devices – BRDs) and practices, in combination, where necessary, with the introduction of legislation and a management framework, including control and enforcement strategies. It will also aim to avoid the capture of turtles (where such by-catch exists)" (Project Document, page 8).

11. The project is implemented at three levels: national, regional and global. The project document foresees that activities will first start in a small group of technically 'more advanced' countries and that the results from this work will then be used in the other participating countries through regional cooperation. At the global level, FAO facilitates the wider international cooperation and information exchange.

Agency and Policy Programme Context

12. The REBYC-project falls under the GEF operational programme 'Integrated Land and Water Multiple Focal Area' (OP #9) which includes the expected outcome "reduction of stress to the international waters environment". The programme aims at helping groups of countries to operationalise sustainable development strategies for international waters environment by using technical, economic financial, regulatory and institutional measures. The REBYC-project is also relevant to GEF's operational programme No 2 (OP #2) 'Coastal, Marine, and Freshwater Ecosystems'.

13. The project objectives and planned activities are consistent with the policies and legal instruments defining the role of UNEP in conservation and maintenance of biodiversity. It is also relevant to the UNEP Regional Seas Programme.

14. The project adheres to the principles of the Code of Conduct for Responsible Fisheries and forms an integral part of the work of the FAO Fisheries Department. The project is particularly relevant to the programme entity 2KA09 'Impact of fishing on the environment' of the FAO Fishing Technology Service (FIIT). This programme entity addresses the problem of by-catches and discards within the context of the ecosystem approach to fisheries and includes activities, e.g. workshops and publications, that are highly relevant and complementary to the REBYC-project.

Executing Arrangements

15. Eleven countries and one regional organisation participate fully in the project (Cameroon, Colombia, Costa Rica, Cuba, Indonesia, Islamic Republic of Iran, Mexico, Nigeria, Philippines, Trinidad and Tobago, Venezuela and SEAFDEC and benefit from the GEF funding. In addition, Bahrain participates using its own funds although recent reports seem to indicate that no further budget is available.

16. UNEP is project implementer and responsible for overall project supervision and ensuring consistency with GEF and UNEP policies. The organisation also has the responsibility for providing guidance with regard to linkages with other related UNEP and GEF activities and to liaise with FAO on a regular basis on substantive and administrative matters. UNEP should also provide advice and policy guidance to FAO and participate in project meetings, as appropriate.

17. FAO executes the project and FIIT of its Fisheries Department is responsible for the international coordination and administration of the project, including the contracting of national institutions to undertake project activities, and the technical oversight and support. A Task Force consisting of FAO experts representing the main disciplines relevant to the project advises the project, reviews work plans and monitors progress. An overall Project Coordinator – and technical advisor – and a Project Operations Coordinator are based in FAO headquarters in Rome, Italy.

18. The counterpart ministries in the participating countries have assigned project National Coordinators (NC) as project focal points with overall responsibility for project execution at the national level. Moreover, in each country, National Project Steering Committees (NPSC) have been established. These consist of researchers, government officials (fisheries department) and representatives of the shrimp trawl industry and other stakeholder groups.

19. An International Project Steering Committee comprising of the responsible ministry from one country in each region[1], UNEP and FAO meets on a regular basis. In addition, international meetings for NCs and other project counterparts are held regularly (generally every year or 18 months).

Budget and Project Duration

20. The total project budget, as stipulated in the project document, amounts to USD 9 150 000 including:

    - GEF funding: USD 4 780 000
    - Co-financing by participating countries: USD 3 250 000
    - In-kind contribution UNEP: USD 110 000
    - In-kind contribution FAO: USD 1 010 000

21. The project duration was initially foreseen to be five years; starting in June 2002 and ending in May 2007. However, due to delays experienced at the inception of the project (see paragraph 72), a no-cost

[1] Two countries, Mexico and Venezuela, represent Latin America considering the large number of countries participating in the project from this region. Other members – in addition to FAO and UNEP – include Iran, Nigeria, the Philippines and SEAFDEC.

extension until June 2008 has been agreed upon (to be formally approved by the International Project Steering Committee at its meeting in January 2007).

Reporting, and Monitoring and Evaluation (M&E)

22. Six-monthly progress reports are submitted by the participating countries to the FAO Project Coordinator. FAO submits two operational reports per year to UNEP/GEF Coordination office. Financial reports on project expenditures are submitted by FAO to UNEP every three months. A terminal report, including a final financial statement, will be prepared by FAO within 60 days of project completion.

23. At the national level, the NC has the responsibility to review progress and liaise with relevant national ministries as well as the NPSC, as required. In FAO, the Task Force monitors progress and at the global level, the International Project Steering Committee reviews project activities and results.

24. During the course of the project, an independent evaluation or review of the project can be organised if deemed necessary by UNEP and FAO. The current mid-term review is carried out in accordance with this provision. Upon completion of the project, a terminal desk evaluation of the project will take place. Two years after project completion, a *post-facto* in-depth evaluation will be undertaken to review the environmental and long-term impact of the project.

This Mid-term Review

Terms of Reference of Mid-term Review

25. The objective of the mid-term review is to assess operational aspects, such as project management and implementation of activities and also the extent to which objectives are being fulfilled. The review will assess project performance and the implementation of planned project activities and planned outputs against actual results. It will focus on corrective actions needed for the project to achieve maximum impact. More specifically, the review will assess:

    - the continued relevance of the expected results, outcomes and objectives to the participating countries;
    - the quality of the outputs produced thus far, and their use by member countries;
    - the likely sustainability of any results/outcome so far and impact of the project. A measure of the project success would be an increased likelihood, since the project began, that desired impacts will be achieved. This could be due to various manifestations of interest shown in the project by countries, changes that have taken place in shrimp trawling regulation/practices, etc.
    - identify possible replication mechanisms, potentially involving more countries.
    - strengths and weaknesses of; the project's management structure, operations, and the various partnership arrangements of the project; (including the appropriateness of the execution means vis-à-vis the project objectives);
    - and consideration (and justification) for another similar project, with different or additional countries, perhaps more ambitious in scope.

The Terms of Reference of the review are attached in ANNEX 1.

Methodology

26. The review was carried out during a total period of 30 days in October-December 2006. The main methods used included:

    - Desk study of relevant project documents and reports, and the project website.
    - Brief review of other relevant literature regarding tropical shrimp fishing, by-catches and the environment.
    - Participation in the Global National Coordinators Review Meeting in the Philippines and discussions with participants, including from UNEP and FAO. Interviews (semi-structured / check-lists) with all NCs (except for Iran and Bahrain – see paragraph 27 below).
    - Discussions with Project Coordinators and other relevant officers in FAO (in person, and by telephone and email).
    - Consultations with stakeholder groups, especially private sector partners, during field visits to project locations in the Philippines (Calbayog), Mexico (Mazatlan and Salina Cruz) and Nigeria (Lagos). Summaries of the findings of these visits are attached in ANNEXES 2-4.

    A list of persons met is included in ANNEX 5.

Limitations

27. The reviewer did not have the opportunity to meet with representatives for the project in Iran and Bahrain since the NCs of the two countries did not participate in the Global National Coordinators Review Meeting in the Philippines and no field trip was made to the Middle East region. While the reviewer has corresponded with the National Coordinators in the two countries and seen the available progress reports, it should be noted that it has not been possible to cover this region to the same extent as Southeast Asia (Philippines), Latin America (Mexico) and Africa (Nigeria).

28. The three relatively short field trips to the Philippines, Mexico and Nigeria have provided substantial inputs to the review. These field trips were organised and supported by the NC and other project counterparts in the counties visited. While the reviewer has no reason to suspect any bias in the information provided, it should be mentioned that the persons interviewed were largely selected by the NCs.

2 MAJOR FINDINGS

Project Design

Project Document and Logical Framework

29. While the project document contains a considerable amount of information, it is not as clear and concise as it could have been. This is particularly true for the logframe, which appears to lack some of the logic that generally governs this type of planning tool.

30. The logframe contains three objectives, five outcomes, four results and eight clusters of activities (see also paragraph 9 above). While these are all generally relevant with regard to the overall objectives of the project, i.e. to "reduce discards of fish captured by shrimp trawlers" as stated on page 9 of the project document, the way they are formulated and the levels of achievement they represent are not consistent. For example, there are no outcomes or activities clearly supporting objective number three.

Moreover, there are few quantifiable indicators and there appears to be some confusion between 'indicators' and 'means of verification', and assumptions and risks are not clearly explained.

31. These shortcomings make it difficult to use the logframe and its indicators as the main tool for reviewing the project and evaluating progress. Nevertheless, a review of the different logframe components – at objectives, outcomes and results levels – is included in ANNEX 6. However, in the sections below the text is presented according to main areas of progress (see 'Main Achievements To-date' below).

Continued Relevance of the Expected Results, Outcomes and Objectives

32. The overall project objective – to reduce discards and by-catch – is found to be of continued or even growing relevance to participating countries. However, it is noted that the project document was conceived some seven or eight years ago and that the accumulated knowledge on the subject matters dealt with has increased since that time. With regard to objective number three, 'Increase knowledge of the impact of shrimp-trawling on marine habitat' – intending in particular the investigation of damage on the bottom habitat by trawling – studies during the last few years show that it is difficult to get conclusive results on such impact (FAO Fisheries Technical Report No 472[2]). Moreover, "tropical shrimp trawling often happens on smooth bottom [marine habitats] with very little growth of bottom fauna and flora" (Half-yearly Project Progress/Operational Report to UNEP Jan-Jun 2006 from FAO). While the issue remains an important concern and merits considerable attention, it is felt that the inclusion of this objective in the project may have been an overly ambitious undertaking considering the overall focus of the project, its level of funding and time frame as well as the capacities of the participating countries.

33. With regard to the main goal of the project – the reduction of by-catch – it has to be recognised that the situation and conditions under which the shrimp fisheries operate vary considerable among countries. In some countries, notably in Indonesia and the Philippines in Southeast Asia and in Nigeria, all or most of the by-catch is utilised and carries a – although sometimes low – commercial value. Hence, operators have little incentive to reduce it. Boat owners and crew may also have different incentives; in some place, by-catch is sold by the crew outside the control of the boat owner. Moreover, low value fish play a role in food security by giving employment to traders/processors and supplying local markets.

34. In other fisheries, e.g. in Mexico and some other Latin American countries, only a minor part of the by-catch is retained – i.e. large individuals of commercial species – and the rest is discarded. Operators are more interested in avoiding by-catch and, for example, save time on sorting the catch. By-catch can also damage the shrimp in the codend and there is an economic incentive to improve the quality of the catch and receive higher prices.

35. The focus of the project is on redesigned gear and BRDs but the project document also mentions fisheries management in a broader sense. Several participating countries are addressing different management issues in parallel with project activities (e.g. effort controls through closed seasons/areas and limits on number of trawlers) and most counterparts appear aware of the need to look at the introduction of BRDs as an integral part of fisheries management. This aspect merits further attention. Modified nets and BRDs can constitute an important part of the solution but has to be seen in a larger context of fisheries management and the application of a variety of management tools and approaches, defined for the specific local conditions.

36. This integrated management approach is particularly important in fisheries and countries where the by-catch has a commercial value and where the application of BRDs alone may not be effective. It is

[2] Løkkeborg, S. Impacts of trawling and scallop dredging on benthic habitats and communities. FAO Fisheries Technical Paper. No. 472. Rome, FAO. 2005.

however also relevant where the industry welcomes modified gear and BRDs. This is usually because the use of BRDs is profitable – e.g. through reduced fuel consumption, less work on board and better quality catch – and if operations become more efficient, there is a risk that the fishing pressure will increase. Close cooperation with the industry and other stakeholders would be a prerequisite and the project has established valuable private sector partnerships.

37. The project addresses the need to formalise the use of the appropriate gear through the adoption of new or revised laws and regulations. However, the next step – to enforce these regulations – is not explicitly included. There is a need to look into monitoring, control and surveillance (MCS) (also where the voluntary use of BRDs by the industry in theory would eliminate the need for active law enforcement!).

38. In most countries, the project activities focus on the industrial sector, i.e. the larger shrimp trawlers. However, in many areas there is an important artisanal fishery, also targeting shrimp and/or species included in the by-catch of the trawlers. The fisheries are hence closely related and to address the broader issues of sustainable fisheries, both sub-sectors need to be considered and included when addressing fisheries management.

Project Performance

39. Overall, the project has made important progress towards the objective of reducing discards and by-catch although there are differences in progress among countries. In spite of a relatively slow start (see 'Project Management' below), substantial results have been produced with regard to data collection, and testing and demonstration of BRD devices and improved gear. Although only a few countries can show concrete results with regard to the wider implementation of the defined/developed BRDs and gear or towards the formal legalisation of their use, most are likely to have made further progress at the end of the project.

40. Considering the short-comings found with regard to the project document, in particular the poorly defined indicators of the logframe (see paragraph 31), the reviewer did not find it appropriate to use only the logframe as the basis for the evaluation of project progress. Hence, progress and achievements have been reviewed within the overall context of project objectives, and the scope and expectations as expressed in the project document as well as considering commonly accepted concerns regarding by-catch. Below an assessment is given with regard the attainment of the three objectives as stated in the logframe. Further comments on progress and achievements are also provided under five headings attempting to summarise the outcomes and results of the project document logframe.

Attainment of Objectives: Current Status and End-of-Project Prognosis

(i) Objective 1: Reduced by-catch taken by shrimp trawlers

41. By-catch reductions have been demonstrated in most participating countries but on a trial basis or by a smaller segment of the industry using BRDs on a voluntary basis. The by-catch reduction rates vary depending on the fishery and exactly what device is used but a reasonable average estimate appears to be around 30-40 percent. TEDs are mandatory in some countries (Colombia, Costa Rica, Mexico and Venezuela are certified for US exports) and used by the industry with generally good results. In Nigeria, the project has contributed extensively to the reintroduction of TEDs and it appears that all shrimp trawlers are now fitted with the device (new regulations took effect in August 2006 and recertification for US exports awaited – see also paragraph 47).

42. While the identification, development and testing of suitable BRDs are well under way in most participating countries[3], an important challenge will be the wider application by the industry. As mentioned above (see 'Continued Relevance of the Expected Results, Outcomes and Objectives' above), economic incentives to the industry only exist in countries where by-catches are not utilised and without market value. Assuming that enforcement of the use of redesigned gear and BRDs is difficult if operators are against them, the project in its current form is likely to be more successful in the Latin American (and Middle East) regions than in the countries in Southeast Asia and Africa. However, also in the Latin American countries, it is likely that only a few countries will have reached the stage where the use of BRDs is being implemented across the industry at end-of-project. This should not necessarily be seen as a failure but a reflection of the time generally needed for introducing changes to fishing practices in a participatory manner.

(ii) Objective 2: Reduce capture of juvenile fish, particularly of species used for human consumption

43. As for Objective 1, the progress made to reduce capture of juvenile fish consists of the development of BRDs and their subsequent use by the industry, a phase that is still under implementation. While assuming that a reduction of by-catches – including of juveniles of commercially valuable species – will lead to increased abundance of larger size food fish in the longer term, it will be difficult to measure this impact at end-of-project. Only in a few places will BRDs have been in use for any length of time by a large enough share of the trawler fleet to start to have an impact on stocks. It will also be difficult to separate the effect of the project from other impacts on the fisheries. Nevertheless, it is expected that the objective will be attained in the longer-term with results showing some years after project completion.

(iii) Objective 3: Increase knowledge on the impact of shrimp-trawling on marine [bottom] habitats

44. This objective has not been directly addressed by project activities. Changes in gear proposed and introduced by the project have been evaluated with regard to its impact on catches and economic efficiency of operations – in accordance with the main focus of the project – but not on the bottom habitats. While the issue of damage to bottom habitats is important, it is felt that it may not belong to the project considering its current scope and budget (see also paragraph 32). If to be addressed, countries could review existing information on the issue and prepare reports to serve as a basis for an evaluation of the need to address marine habitats at a later stage or under a different project arrangements. This identification of issues would then constitute a partial attainment of the objective. However, the reviewer is hesitant as to whether such efforts would represent optimal use of the remaining time and resources of the project (see 'Recommendations' below).

Main Achievements To-date

(i) Development and adoption of by-catch devices and alternative gear

45. For several fisheries in the participating countries, tests of BRDs have been completed and the types of devices that should be promoted and recommended for regulations have been defined (e.g. in Calbayog in the Philippines, in Colombia, in Nigeria, for the Pacific coast of Mexico).

46. In Nigeria (for TEDs, BRDs and codend mesh size) and in Mexico (for fishing in National Protected Areas and for TEDs), new regulations have already been enacted based on recommendations contributed by the project. Other countries will review the legislative requirements for introducing BRDs as a subsequent step after the technical work on defining the devices has been completed. FAO, through its project legal advisor, has recently started to support this work by assisting in the carrying out of national baseline reviews. In a couple of countries, legislative reviews/revisions have taken

[3] Exceptions are Cameroon (work has however been carried out in collaboration with Nigeria where Cameroonian trawlers in fact land their catch), Trinidad and Tobago (trials just starting) and possibly Bahrain and Iran where actual progress has been difficult to assess.

place recently although not – or only partially – influenced by the project (Indonesia, and Trinidad and Tobago).

47. The project has been instrumental in the process of achieving recertification for Nigeria for exports to the US through the reintroduction of TEDs. Among other things, a workshop on TEDs was organised in Hirthals, Denmark, with the participation of a representative of the National Oceanic and Atmospheric Administration (NOAA) of the United States Department of Commerce. An inspection visit to Nigeria by an American team took place in September 2006 with positive results; a confirmation of the recertification is expected to be forthcoming within the near future.

(ii) Improved management of shrimp trawling fisheries

48. As mentioned above (see 'Continued Relevance of the Expected Results, Outcomes and Objectives' above), some participating countries view and carry out the core project activities in a larger context of shrimp fishery management. In some countries, these activities were already part of national priorities and work plans before the project while in others it would appear that the project has triggered increased recognition of these issues. It could be argued that the pragmatic and hands-on technological approach of the project has served as an important entry point for wider management discussions with the private industry and other stakeholders.

(iii) Increased cooperation among countries

49. Intra-regional technical cooperation has been extensive and useful, and inter-regional exchanges are also appreciated. Considering the need to adopt technologies and regulations for the local context, an important part of the work needs to done at the national level. At the same time, regional harmonisation is important in areas where fishery resources and marine habitats are shared. Such cooperation has been initialised between Nigeria and Cameroon and a further step is being taken by the organisation of a workshop for neighbouring Gulf of Guinea countries in January 2007.

50. It is noted that the project has not followed the approach described in the project document, i.e. to carry out demonstration activities in a limited number of countries, generating lessons that can then be easily transferred to neighbouring countries. Instead, activities have been started in all countries in parallel but with exchanges of experiences as part of these activities and some project partners playing a leading role:

    - Mexico is providing technical assistance to neighbouring countries, including Colombia, Costa Rica, Cuba, Trinidad and Tobago, and Venezuela.
    - Nigeria is working closely with Cameroon.
    - SEAFDEC provides assistance to its member countries Indonesia and the Philippines. In Box 1 and in ANNEX 7, further information is given on SEAFDEC's involvement in the project.

51. In some countries (e.g. Cameroon, Colombia, Trinidad and Tobago), there is a lack of qualified fishing technologists and the collaboration with neighbouring (i.e. Nigeria and Mexico) countries has been particularly important for achieving results with regard to the development of BRDs.

(iv) Better understanding of the interactions between fishing gear and environment

52. While the project has not addressed the issue of bottom habitat impact by shrimp trawling, the knowledge on interactions between fishing gear and the environment has been improved through a better understanding of by-catch compositions and quantities. In several countries (notably in Colombia, Nigeria, Philippines, Trinidad and Tobago, and Venezuela), the project allowed for observer programmes or other investigations of the shrimp trawl by-catches. This information is essential for understanding the impact of the shrimp trawl industry on the ecosystem.

Box 1: SEAFDEC and the REBYC-project

The Southeast Asian Fisheries Development Center or SEAFDEC is an autonomous intergovernmental organization established in 1967 to promote fisheries development in Southeast Asia. The organization currently has eleven member countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

SEAFDEC has a Secretariat based in Bangkok, Thailand, as its administrative arm and four technical departments, i.e. the Training Department also in Bangkok, the Marine Fisheries Research Department in Singapore, the Aquaculture Department in the Philippines and the Marine Fisheries Resources Development and Management Department in Malaysia.

SEAFDEC started work on BRDs in 1996 and has been involved in developing the Thai Turtle Free Device (TTFD) and four types of Juvenile and Trash-fish Excluder Devices (JTEDs) for shrimp trawls. There are the Rectangular Shape JTED, the Circular Shape JTED, the Rigid Sorting Grid JTED and the Semi-curved Rigid Sorting Grid JTED. The development and testing of the devices continued in collaboration with the REBYC-project as of 2002. Under the umbrella of the REBYC-project, SEAFDEC has supported the Philippines and Indonesia with practical demonstrations and sea trials and experiments. Several collaborative workshops and training events have also been organized jointly by SEAFDEC and the project. Another important contribution by SEAFDEC to the project is the development and production of promotional and information material. A complete list of the material produced for the project is included in ANNEX 7.

53. In Nigeria and Trinidad and Tobago, socio-economic studies are under way to provide information of the social and economic importance of by-catches. As mentioned above (see paragraph 33), by-catches appear to play an important role in food security for poorer population groups in some countries but their exact role is not yet well understood. The results of the socio-economic studies will help defining the need for mitigating measures to ensure that a reduction of by-catches do not unduly affect those basing their livelihoods on the availability of small fish from shrimp trawlers. It will also provide insight into how BRDs can be introduced more effectively, e.g. by a better understanding of the reasons behind possible resistance.

(v) Capacity building, awareness raising and outreach

54. A major achievement of the project is the cooperation with the shrimp trawl industry and other stakeholders. In some countries such collaboration existed already before the start of the project (e.g. in Mexico) but the project has contributed to reinforcing and formalising this partnership. Industry representatives are members of the NPSCs and have been closely involved in project activities such as sea trials, meetings and workshops.

55. Thanks to this close collaboration, the awareness of the importance and usefulness of BRDs and the knowledge of possible technical solutions have been considerably enhanced on behalf of the industry. Also researchers and officials of relevant national institutions and administrations have benefited from the project in this respect. At the policy and political level, results vary among countries but increased attention to the issue of by-catches has been demonstrated through the enactment of new regulations and policies (e.g. Nigeria, Mexico) or apparent willingness to do so (e.g. Philippines) (see also 'Project Impact' below).

56. The project has produced several publications that have played important roles in awareness raising and knowledge enhancement, e.g.:

- Publication of an FAO manual/guide on BRDs. The document has been published in English and Arabic and is in the process of being translated into French and Spanish (see Box 2).
- Publication of training materials on Juvenile and Trashfish Excluder Devices (JTEDs) by SEAFDEC (see also Box 1 and in ANNEX 7).

Box 2: A Guide to Bycatch Reduction in Tropical Shrimp-Trawl Fisheries

The guide was developed by the REBYC-project and is designed for fishermen, net makers, fishing technologists and others interested in a practical guide to the design, use and operation of by-catch devices. The guide is also useful to fishery managers, policy makers and legislators needing to develop specifications governing the design and application of these devices in shrimp trawl fisheries.

The guide has so far been printed 1 000 copies in English and 2 000 in Arabic. Almost all the English copies have been distributed and FAO is currently in the process of reprinting another 1 000 copies. A Spanish translation will be printed in 2 000 copies and the text has recently been translated into French in collaboration with GAPCM (*Groupement des Aquaculteurs et Pêcheurs de Crevettes de Madagascar*) who has also offered to be responsible for the printing. The document is also available as a downloadable version on the REBYC-project website.

Besides obvious receivers like all the project NCs and the FAO offices in the project countries, UNEP and GEF, copies of the guide have been sent to the Maritime Stewardship Council (MSC), WWF, NOAA and to selected Large Marine Ecosystems (LME) projects. Copies have also been distributed to participants in the 3rd GEF International Waters Conference in 2005, and at project workshops. About 1 500 of the Arabic version have been sent to the FAO Regional Office in Cairo for further distribution to Arabic speaking non-project countries. According to feedback received, it appears that the English and Arabic downloadable versions have been accessed by national fisheries authorities, universities, NGOs, fishing magazines, etc.

Bibliographic reference: Eayrs, S. A Guide to Bycatch Reduction in Tropical Shrimp-Trawl Fisheries. Rome, FAO. 2005.

57. The project has a website that is managed by FAO. Project progress reports, meeting minutes, news briefs and other information are posted on the site. However, there have been delays in the inclusion of new material and the web site is not overly user friendly.

58. It is worth noting that BBC World recently has broadcast a programme on shrimp trawling and by-catches ("Potted Shrimps"). The programme team visited two of the project locations in Mexico and the Philippines and also interviewed FAO staff (Mr Turner, Chief FIIT).

Likely End-of-project Achievements

59. Assuming that no major interruptions take place and that project activities are continued as currently planned, the following achievements are expected at the completion of the project in June 2008:

- Suitable BRD designs for all shrimp trawler fleets will have been identified in all participating countries.
- At least 25% of the industrial shrimp trawlers in at least half of the participating countries will be using BRDs and by-catches will have been reduced by 30-40 percent on the vessels using the devices.
- Relevant new and/or revised legislation will have been enacted in at least half of the participating countries. The need and scope for legislative changes for formalising the use of BRDs will have been identified in all other participating countries.
- Discussions will have been initialised and preliminary agreements to harmonise regulations on BRDs in at least one (West Africa/Gulf of Guinea), possibly two (Latin America), of the participating regions will have been reached. Moreover, at least ten non-project countries will have participated in project meetings and formally expressed interest in developing BRDs through regional cooperation.
- The awareness and knowledge on BRDs will have been enhanced and at least half of the industrial shrimp trawl owners and operators in the project areas will know and be able to explain the basics regarding the usefulness and how to operate BRDs.
- Studies in Nigeria and Trinidad and Tobago will have been finalised and there will be an improved understanding of the socio-economic importance of by-catches, in particular as a source of income for poorer population groups.
- A number of high quality publications and visual material will have been produced (in addition to that produced already, mentioned in paragraph 56 above):
    - The FAO by-catch/guide will have been published in Spanish and French in addition to current Arabic and English versions.
    - At least one technical paper (FAO Fisheries Technical Paper or similar) and one legal technical paper including experience from at least five of the participating countries has been published.
    - At least three scientific articles written jointly by researchers from participating countries haven been published in accredited journals and/or presented at international conferences.
    - Videos have been produced (based on the BBC World documentary) in English and Spanish and have been widely distributed.

60. In addition, if the recommendations given in this report are implemented, additional outputs are likely to be produced, in particular with relevance to an exit strategy for supporting the sustainability of results after project completion and measuring – to the extent possible – the impact of the project on the environment (see (see 'Recommendations' below and proposed targets in ANNEX 6).

Project Impact

61. Project impact so far relates in particular to the creation of awareness of the problem of by-catches and to improved knowledge of available technical solutions. As discussed above (see '(v) Capacity building, awareness raising and outreach'), this has been achieved at different levels, i.e. industry, researchers, government officials and decision makers. Impact at the political level appears to have been best achieved where FAO support has been visible, through meetings and visits by staff and consultants. Examples demonstrating political influence include the active involvement in project activities by the mayor's office in Calbayog, the Philippines, and the participation of the Minister of State of Agriculture and Rural Development in the opening session of a recent project workshop in Lagos, Nigeria.

62. The project has also contributed to increased awareness and knowledge at the global level by publishing reports that are accessible to a wider global audience. The BBC World programme (see paragraph 58) is another important contribution to 'global awareness'. The exact impact of this type of

outreach is difficult to measure but it has to be assumed that it improves the political willingness to address the concerns relevant to the shrimp industry and by-catches.

63. The project has had a more concrete impact in the countries where new or revised regulations for the use of BRDs have been enacted and their use is under implementation (Nigeria and Mexico). The degree to which other participating countries will have completed similar processes by end-of-project will be decisive for project impact in this area (see also paragraph 68 below).

64. Impact at the higher level of positive environmental changes is still early to judge but if the assumption that reduced by-catches have a positive effect of on the ecosystem holds and no negative externalities are created in the process, such impact will be achieved once the technical solutions provided by the project are implemented on a wider scale. The project document stipulates a final review to take place two years after project completion. This indicates recognition of the time required for environmental impact to start to show. To introduce changes to the industry is generally a time consuming task and to be able to see the clear results on resources will take even longer.

Sustainability and replicability

65. The project seems generally well integrated in national work plans and policies. In some countries, work on BRDs started before the project and its activities are now supporting already existing programmes (see Table 1). Other countries have incorporated the objectives and activities of the project into overall national priorities and work plans and are going to continue the activities of the project also after its completion. This may be at a slower pace – considering that the external funding will be lacking – but most countries already make substantial in-kind and cash contributions (of which the latter was not foreseen in the project document) which would appear to be a clear sign that national budget could also be made available in the future (see also 'Budget and Expenditures' below).

66. Country ownership is demonstrated by the considerable level of initiative and planning capacity that has been required by the participating countries. This role appears to have been played successfully by the NCs and the NPSCs. All NPSCs include members from the shrimp trawl industry / private sector and this participatory approach is seen as a key to the progress achieved. Sea trials have often been carried out in close cooperation with the industry and awareness and knowledge have also be dissemination through workshops and training events involving the industry. Activities – although supported and coordinated by FAO – are largely country-driven, and planned and implemented with a great deal of local initiative.

67. With regard to likely sustainable impact of the project, there is an important difference between the countries where by-catch is utilised and carries a commercial value and those where by-catch is generally not wanted and discarded. As mentioned above (see, for example, paragraph 42), the project is likely to be more successful – and sustainable – in countries where there are economic incentives for the industry to reduce by-catches.

68. Several countries are expecting to pass new regulations although in some cases this may not take place before the end of the project due to the lengthy processes involved. Moreover, while NCs generally are in the position to make official recommendations for changes in legislation and the introduction of regulations with regard to the use of BRDs, many do not have the mandate or political power to actually ensure that these changes in the legislative framework take place. In some cases, the successful implementation of the project results will depend on a political process that it can only partly influence.

Table 1: Preliminary baseline assessment: pre-project BRD status by country

Country	*Policy and legislation on or related to BRDs existing pre-project*	*Use of BRDs pre-project*	*Certification for US exports*
Cameroon	General fisheries legislation. None specific to shrimp trawling.	None.	No
Colombia	General fisheries legislation and regulated shrimp trawl fishery (gear, vessel type, fishing areas, species etc.) since 1970s. TEDs mandatory for shrimp trawlers.	TEDs.	Yes
Costa Rica	New general fisheries and aquaculture law with specific reference relating to TEDs that are mandatory for shrimp trawlers.	TEDs.	Yes
Cuba	Only mesh size regulations.	None.	No
Indonesia	TEDs (and BRDs?) mandatory for industrial vessels using shrimp trawls.	BRDs (double oval frame of pipes) and TEDs ('Super shooter') but industry experiencing difficulties in operating them.	No
Iran	General fisheries legislation and regulations specific to shrimp trawling with gear specifications.	*Information not available.*	No
Mexico	General fisheries legislation and regulations specific to TEDs which are mandatory for shrimp trawlers.	4 types of TEDs and BRDs in Gulf of California (fish eye).	Yes
Nigeria	General fisheries legislation. TEDs mandatory for shrimp trawlers (but no penalty regime) and codend regulations.	TEDs.	No (but in process)
Philippines	General fisheries legislation. Only mesh size regulations regarding by-catches.	No use of BRDs but limited experiments with TEDs.	No
Trinidad and Tobago	General fisheries legislation and 1994 Conservation of Marine Turtles Regulations and Notification for Use of TEDs for Commercial Shrimp Trawling	TEDs.	No
Venezuela	General fisheries and aquaculture legislation. TEDs mandatory for shrimp trawlers.	Experiments with BRDs (square mesh window) carried out.	Yes
Bahrain	General fisheries legislation. Ban on capture of sea turtles and shrimp trawl net specifications.	None.	No

Source: Legal review questionnaires (administrated by FAO project legal advisor), FAOLEX (http://faolex.fao.org/faolex/index.htm) and national project reports.

69. In addition to the industry's interest and incentives for using BRDs and the enactment of legislation to formalise their use, another important component from a sustainability perspective is enforcement. While the requirements in this area could in principal be defined by the project, the actual implementation of MCS would generally involve collaborative action by a larger number of players (e.g. fisheries department, navy/coast guard, etc) which would not necessarily be within the scope of the current project. The issue relates to the need for a wider fisheries management perspective, already referred to above.

70. Several non-participating countries have expressed interest in joining the project. In addition to the initiative taken in the Gulf of Guinea, West Africa (see paragraph 49), meetings and workshops have been held in Latin America to which non-project countries have been invited to participate at their own expense, i.e. Brazil, Suriname and Guatemala. In Asia, Cambodia, Vietnam, Malaysia and Myanmar have participated in project meetings. Moreover, the Coastal and Marine Programme of the Environment Initiative of NEPAD[4] - COSMAR – in Nairobi has also expressed interest in the project.

71. It would appear possible to replicate many of the project's approaches and extend the project to new countries, in particular considering the interest already shown by potential candidates. The focus on technology, the involvement of the private industry, and the regional and international cooperation have proved to be valid approaches. However, in order to ensure sustainable results a wider fishery management needs to be considered (see also 'Recommendations' / 'A New Project' below).

Project Management

Project Operations

72. In most countries, project activities – and hence the achievement of results – were delayed due to administrative difficulties at inception. It was initially foreseen that the project would be executed by counterpart institutions through direct funding by FAO via Letters of Agreement (LOAs). However, in several of the participating countries, local regulations make it impossible or difficult to establish LOAs and funds are instead channelled through the local FAO Representation. The initial difficulties have been overcome and work plans are now generally adhered to. However, overall progress has in most countries been slower than originally expected and a no-cost extension until June 2008 has been recommended to compensate for the original delay (original completion date was May 2006).

73. The tsunami in December 2004 put considerable pressure on the FAO Fisheries Department and FIIT was particularly closely involved in the emergency response. This could have had a certain negative impact on the support extended to the project during the first half of 2005 although no particular delays were mentioned by the NCs in the interviews with the reviewer.

74. The current technical and operational support from FAO is generally appreciated and considered adequate. However, it appears that the technical and operational support at the beginning of the project could have been strengthened. Many countries feel that they could have benefited from more information on existing BRDs (in the world and in their regions) and a more detailed discussion on the technical solutions that are likely to be appropriate for the different countries and fisheries. Moreover, at present a clear process for documenting the results of technical trials carried out and lessons learnt appears to be lacking.

75. Visits by FAO (and UNEP) headquarter staff and the participation in project meetings by local FAO Representatives constitute valuable inputs to national processes requiring political support. Such visibility can play an important role and give increased weight to recommendations from the NPSCs regarding, for example, legislative amendments. The cost of providing technical and operational

[4] New Partnership for Africa's Development.

support, in particular through visits and participation in meeting, should however not be underestimated.

76. In the last international project meeting – the Global National Coordinators Review meeting in the Philippines – simultaneous interpretation between English and Spanish was provided for the first time. This proved to be a great advantage for several of the Spanish speaking participants who felt they could participate more fully in the meeting.

77. The participating countries submit six-monthly work plans and project progress reports to the Project Coordinator, generally in a timely manner but with a few exceptions[5]. In turn, FAO provides progress reports and financial reports to UNEP. Due to the weakness of project logframe indicators, monitoring progress against them has not been useful. FAO coordinates work at the global level although no detailed work plan for the current period was available at the time of the review.

78. The involvement of UNEP has been limited; virtually no feedback has been provided to FAO and the participating countries on the progress made and reports submitted. It appears that the Global National Coordinators Review Meeting in the Philippines in October 2006 was the first in which a UNEP official with responsibility for the project participated.

Budget and Expenditures

79. Project budgets appear in most countries to be adequate considering the focus on technology development and the co-financing contributed by government and the industry in the participating countries. However, in some countries, e.g. Cameroon, funds have been minimal, limiting the possibilities to carry out any extensive activities. This problem has to some extent been overcome through regional cooperation.

80. The level of total disbursement of GEF funds (delivery) was 56 percent on 30 September 2006. Partners having spent at least 70 percent of their funding granted by GEF include Cameroon, Colombia, Mexico, Philippines and SEAFDEC. Iran and Costa Rica have spent only about 20 percent, and Trinidad and Tobago about 30 percent. While information and reporting from Iran is insufficient for assessing the situation, Costa Rica is planning to use the available funds before end-of-project; the delay in delivery so far is due to the administrative problems – which took particularly long time to solve in Costa Rica – encountered at project inception (see paragraph 72). In Trinidad and Tobago, limited staff resources has constituted a problem. This is not project specific; the fisheries department does not, for example, have a fishing technologist. Support is currently being given to Trinidad and Tobago by Mexico and the department plans to hire a national gear technologist for the project.

81. A table summarising the financial situation of the project is included in ANNEX 8. It is noteworthy that the total actual level of co-financing by governments has exceeded that planned. In addition to in-kind contributions, foreseen in the project document, some countries have also contributed in cash (e.g. Mexico and Colombia). Contributions by the private sector have also been substantial although the reporting thereof has been deficient and the sums included in the table are likely to be significantly underestimated. It should be noted that also the co-financing information is incomplete for some countries (e.g. for Bahrain, Cameroon, Iran and Nigeria).

[5] Reports from Iran are generally lacking and monitoring of progress has mainly taken place during visits by the FAO Project Operations Coordinator.

3 CONCLUSIONS, RECOMMENDATIONS AND LESSONS LEARNT

Summary of Findings

Project Design

82. The project document and the logic framework (logframe) are found to be lacking in clarity. In particular, the logframe indicators are poorly formulated and not particularly useful for progress monitoring purposes.

83. The overall project objective – to reduce discards and by-catch – is found to be of continued relevance to participating countries. However, with regard to objective number three, 'Increase knowledge of the impact of shrimp-trawling on marine habitat' – intending in particular the investigation of damage on the bottom habitat by trawling – it is felt that the inclusion of this objective in the project may been an overly ambitious undertaking considering the overall focus of the project, its level of funding and time frame as well as the capacities of the participating countries.

Project Performance and Impact

(i) Major Achievements and Strengths

84. Overall, the project has made important progress towards the objective of reducing discards and by-catch although there are differences in progress among countries. In spite of a relatively slow start, substantial results have been produced with regard to data collection, and testing and demonstration of BRD devices and improved gear. Although only a few countries can show concrete results with regard to the wider implementation of the defined/developed BRDs and gear or towards the formal legalisation of their use, most are likely to have made further progress at the end of the project.

85. Main project strengths include the close partnership with the industry. The focus of the project on technology appears to have been an important entry point for this partnership; the industry has shown keen interest in gear development as something concrete to work on. As the knowledge of the role of by-catches increase, the understanding of the wider management issues will also increase. In some countries (e.g. Mexico), the industry is asking for better management of the shrimp fishery, seeing that closed seasons and areas would benefit them by providing sustainable catches of larger size shrimps. However, the interest of the industry remains focused on profit, in particular in the short-term, even though a better understanding of the resource dynamics and ecosystem is likely to make boat owners more inclined to think of sustainability of production in the longer term.

86. Another strength of the project is the regional and – although to a somewhat lesser extent – international, cooperation. While the technical solutions to by-catch reduction need to be adapted to local conditions, the technology transfers and exchanges of experiences – together with the technical support by FAO staff and consultants – have been instrumental in the success of the project. The reviewer also found it interesting to note the apparent close friendships among project NCs and staff and the unusually positive atmosphere during the Global National Coordinators Review Meeting in the Philippines. The importance of this positive 'project spirit' should not be underestimated although it would be difficult to demonstrate a direct link to more healthy ecosystems!

87. Regional cooperation has also been achieved in the context of harmonisation of regulations, i.e. the cooperation initialised between Nigeria and Cameroon. A further step is being taken by the organisation of a workshop for neighbouring Gulf of Guinea countries in January 2007.

88. The project has produced a high quality publication 'A Guide to Bycatch Reduction in Tropical Shrimp-Trawl Fisheries'. Training material has also been produced by SEAFDEC, in particular on the use of JTEDs. In this important area of outreach and awareness creation, the project is in a strong position for doing more considering its technical results and lessons learnt.

(ii) Weaknesses

89. With regard to likely end-of-project achievements, there are important differences between the countries where by-catch is utilised and carries a commercial value and those where by-catch is generally not wanted and discarded. The project is likely to be more successful in the Latin American (and Middle East) regions than in the countries in Southeast Asia and Africa. This argument is based on the assumption that enforcement of regulations will be difficult and that the voluntary cooperation of the industry is essential. Moreover, where by-catch is being used, it often plays an important role in food security for poorer population groups and this situation needs to be better understood.

90. While industry cooperation is strong and a fundamental basis for a successful introduction of BRDs, there is also a need to formalise their utilisation. The project addresses the need of legislative revisions but the next step – to enforce the revised or new regulations – is relatively poorly addressed. Moreover, due to the technical focus of the project, most countries are only starting to address the legislative issues now. While this would appear to be a natural sequence of events, it will be important to give emphasis to the revision of relevant legislation during the remaining part of the project. It should be noted that the enactment of regulations as well as questions regarding MCS generally require action and political support beyond the normal sphere of influence of the project.

91. While the technical focus of the project has been a successful approach, it would appear important that the development and introduction of BRDs are combined with other management tools and that a holistic approach to safeguarding the sustainability of shrimp trawl fisheries is taken. Several participating countries are addressing different management issues in parallel with project activities (e.g. effort controls through closed seasons/areas and limits on number of trawlers) and these aspects merit further attention.

92. Changes take a long time and results can generally not be rushed. Applying a participatory and partnership approach requires time and patience and this has to be accepted for good results to be achieved. While project results could possibly have been enhanced by avoiding the initial administrative delay and by provision of more technical and operational guidance at project inception, the reviewer feels that it generally would have been difficult to achieve more – and will be within the remaining duration of the project – than what has been done and is planned. It is not expected that the application of a broader management focus and addressing MCS – mentioned above as important but weak components – could have been fully considered within the scope and timeframe of the current project. However, to ensure sustainability and further address ecosystem concerns, these aspects need to be addressed – together with continued work on the use of BRDs – in the future.

93. The project is based on the assumption that a reduction of by-catches has a positive impact on the ecosystem. While the validity of this assumption is not questioned, there is a need to review and document how the project results impact on ecosystem conditions. A process for documenting the results of the technical trials carried out and lessons learnt appears to be lacking and this is something that needs to be addressed during the reminder of the project.

Recommendations

Suggestions for the Remaining Part of the Project

94. A clearer logical framework with well-defined impact indicators would help in the monitoring of progress of the project. While it would appear somewhat late in the day to spend substantial effort on rewriting the logframe at this point in time, it does appear necessary to make some amendments to the current indicators for monitoring purposes. It would also be desirable to better reflect work actually carried out and important results achieved. This was discussed in the Global National Coordinators Meeting in the Philippines and a set of indicators referring to the overall objective is currently under

review by the participating countries and FAO. As an input into this work, end-of-project targets for all the logframe objectives, outcomes and results have been suggested by the reviewer (see ANNEX 6).

95. Baseline data will be needed to demonstrate the project's role in achieving the targets and such baseline information should be documented together with the revised indicators. Some indications are already being included in this mid-term review report (e.g. situation pre-project with regard to work on by-catches/BRDs – see Table 1) but the information needs to be verified and detailed on a country-by-country basis.

96. In addition to the revision of targets and indicators, work plans for the remaining time of the project should be reviewed at both the national and the global levels and updated with appropriate detail, including milestones for close monitoring of progress. NCs should submit national work plans as soon as possible to the Project Coordinator who will also establish a global work plan. For monitoring and accountability purposes, progress against these work plans should be documented.

97. The overall project approach based on close cooperation with the industry should be continued and further strengthened. This type of partnership is invaluable for implementing management measures and could also, for example, form the basis for future co-management. Measures should be taken by governments and participating counterpart institutions to institutionalise the arrangements in order for the collaboration and consultations to continue beyond project completion. Regular meetings and events organised by government institutions/departments to which the industry is invited, joint research or gear development activities and a widely distributed newsletter with contributions by the private sector could support such long-term partnerships and should be planned to continue after project completion. The discussions with the industry could be broadened to exchange information and opinions among the industry, researchers and politicians on fishery management and to solicit views and advice on what is needed – from the industry's point of view – to ensure the sustainability of the shrimp fisheries. Preferably such consultations should be followed up by action, not to make the industry 'waste time only talking' although the current project may offer little scope in this respect and follow-up activities need to be planned as part of the 'exit strategy' or a new project (see below).

98. During the remaining part of the project, results should be consolidated and efforts made in particular to ensure that the necessary legislative enactment takes place. Countries should make sure that they benefit from the available support from FAO in this respect. At the national level, NCs should strive at involving relevant legal advisors and policy makers to facilitate the process.

99. Additional visibility of FAO/UNEP in project countries could play an important role in soliciting support from higher national political levels for new policies and regulations. The agencies should support this process to the extent possible. NCs and NPSCs should inform the Project Coordinator of when such support is required and in what form, and detailed plans should be made in the project and FAO/UNEP work plans, as necessary.

100. While no new activities are suggested for the remaining part of the project – consolidation of existing results and ongoing activities is considered more important – efforts should nevertheless be made to review and document the results achieved and analyse their importance in relation to the environment and ecosystems. It would, for example, appear worthwhile to conduct a consolidated review of the sea trials carried out, demonstrating the differences in selectivity of different gear and BRD types. By relating the data obtained by the project to the knowledge and theories currently available within the wider international research community, such an analysis could provide some indication – or 'pointers' – of the project's likely impact on the ecosystem. The results of the analysis should be published (see paragraph 103 below).

101. While it would be possible to partially address project objective number 3, 'Increase knowledge of the impact of shrimp-trawling on marine habitat', by carrying out a (desk) study to identify issues and concerns with regard to the impact of shrimp trawling on marine habitats in specific project areas, the

reviewer is uncertain as to whether this would be a worthwhile effort. However, considering that the objective is part of the project design, it is suggested that the issue is discussed at the forthcoming international Project Steering Committee meeting. If it is decided not to pursue any activity in this respect, the decision should be clearly justified and documented.

102. The project website requires some attention, e.g. uploading of most recent reports, ensuring that titles of reports include country and date, provision of additional links within the website to reports to make them more easily accessible, etc. Countries should also ensure that links between the website and the homepages of relevant national organisations are set up. Considering the completion of the project in 2008, participating countries should discuss the need to maintain the website in the future and, if so, how this could be done. A more useful approach than maintaining a separate (ex-)project website may be to link it, or include essential material from it, to a wider shrimp trawl or by-catch website that could be set up by FAO. This would obviously require a long-term commitment on behalf of FAO.

103. While the website constitutes an important tool for communication, it would appear more important for outreach and impact to ensure that project results are documented in published reports. It is strongly recommended that a number of high quality articles/reports are prepared and published in journals as well as in the FAO Fisheries Technical Report series (or similar). This would probably be the most efficient way to ensure that project results and lessons-learnt are available to a wider audience, in particular after project completion. The review and analysis of the results of the BRD trials in relation to ecosystem impact – mentioned in paragraph 100 above – could constitute one such report. Information on the legal requirements and data collected through reviews could form the basis for a legal technical paper. It would also be opportune to evaluate the large amount of training and promotional material produced in particular by SEAFDEC and reproduce/translate/elaborate important items for a wider distribution.

104. The project could also consider organising an international end-of-project technical seminar or conference in which results and achievements are presented. International experts, researchers and other interested parties should be invited and working groups to discuss specific issues could be part of the agenda. The proceedings from the conference should be edited into a high quality document and published. Similar events could be organised at the regional and national levels, as appropriate.

105. Exit strategies – i.e. post-project follow-up activities to ensure sustainability of results – at national and global levels need to be developed with some urgency. Concise and practical plans formulated for how the work will continue after the project funding ceases in order to ensure best possible impact should be made and documented. Research and other counterpart organisations in participating countries should make every effort to include relevant activities in their future work plans and budgets.

A New Project? – Yes!

106. While the project is likely to have a sustainable impact on the use of BRDs in a number of countries, this achievement could be further strengthened if continued support was given. The approaches established, in particular the close government-industry cooperation and the regional collaboration are valuable and this momentum should be used to expand both the scope of the project and its geographical coverage.

107. Accordingly, a continuation of the project – a phase 2 – is recommended, allowing to follow-up on existing activities but with a broader scope also addressing other management issues. Aspects to consider for such a project include:

- Consolidation of results already achieved and support to ensure that the necessary legislation is in place to support the use of modified gear and BRDs (in countries where this has not yet been achieved during the current project).
- Support to continued dissemination of knowledge, awareness raising etc, to encourage the industry to reduce by-catches. Continuation of the experiments and sea trials in collaboration with the industry to further improve gear and BRDs.
- Consideration of the socio-economic importance of by-catches, in particular in areas where they have a role in poverty alleviation and food security. Identify and implement mitigating measures.
- Review of the status of the shrimp resources and its impact on other fishery resources and identification of management options as well as MCS needs. This process should take place in close collaboration with the industry and artisanal fisheries as appropriate. Possible management measures to consider include Marine Protected Areas (MPAs), closed seasons, limitations of licences and capacity controls. Co-management approaches should be considered where appropriate.
- Develop management plans, again in collaboration with relevant stakeholders, including realistic and practical approaches to improving the sustainable management of the resources.

108. A project with a broader management focus needs to be carefully formulated and the lessons-learnt from the current project should be taken into account (see examples under 'Lessons Learnt' below). It is believed that one reason for the successful stakeholder participation has been the practical technological focus of the project. While the scope of the new project is proposed to be much broader, similar suitable approaches should be identified and objectives and outcomes clearly formulated.

109. Additional countries should be invited to participate in the project and regional cooperation and technological transfers between countries encouraged. There are several countries that have already expressed interest and participated in some meetings. If the number of countries becomes large, more focus on the intra-regional collaboration may need to be considered, or the setting up of several regional projects under one global umbrella programme. The possible role that could be played by Regional Fishery Bodies (RFBs) should be investigated (e.g. OLDEPESCA in Latin America).

110. Eco-labelling constitutes an incentive for the industry to adopt sustainable production practices. In the design of a new project, this concept should be investigated to determine whether it contains a possibility for promoting more sustainable shrimp trawling.

111. The current project finishes in June 2008, i.e. in one and a half year's time. If a follow-up project is to be launched, it should preferably start immediately or as soon as possible after the end of the current project. This would require that work on project formulation be started without delay. The process should be participatory – using the mechanisms for stakeholder consultations already established in the countries participating in the current project and creating similar procedures in new countries – and allow for sub-regional and country specific activities under an overall umbrella of improved management of tropical shrimp trawl fisheries.

Lessons Learnt

112. When designing a new or second phase project, the following lessons are worth keeping in mind:

- True and active participation of the fishing industry is essential for success.
- Country-driven activities and national coordinators with a fair amount of autonomy and responsibility are likely to lead to more successful projects. At the same time, international technical and operational support is important for guiding and facilitating national activities and developments. Moreover, appropriate national capacities for project implementation need to be available or, if not, supported as appropriate.

- Visibility of international agencies (UNEP/FAO) can play a critical role in obtaining national political support
- While fisheries management and ecosystem approaches are highly complex matters, a project with a clear focus and a 'simple' design is likely to be more successful than one that is trying to 'do everything'.
- Changes in behaviour, practices and attitudes – in particular those with substantial and sustainable impact – are likely to take time and resources and both these aspects need to be provided for in a project.
- Communication is important at all levels and means of communication need to be provided, e.g. opportunities to meet and discuss, interpreters when language could constitute a barrier, etc.
- Publishing valuable results 'properly', i.e. not only in project ('grey literature') reports but in journals or (FAO) technical papers is essential for making these results known and useful to a wider audience.

Final Remarks

113. The reviewer found the mid-term review assignment to be an unusually interesting and stimulating exercise. The REBYC-project appears to be a successful project making real changes happen on the ground. Although the final impact and sustainability of the project results are still to be verified and efforts continue to be needed during the remaining part of the project – and beyond – the hard work put in so far by the project partners seems to well worthwhile.

114. The last one and half year will obviously be crucial for the final results of the project. It is important to plan this period carefully and it is suggested that the FAO Project Coordinators prepare suggestions for actions and a detailed global work plan to be presented and decided on in the International Steering Committee meeting to be held in March 2007 or agreed on by project partners in any other suitable way as soon as possible. National Coordinators should do the same at the national level.

115. Moreover, good results need to be documented and communicated in order to gain support and exercise influence. Also for accountability purposes, it would be desirable to improve the monitoring mechanisms of the project and the planned revision of the project indicators appears essential in this respect. It is felt that UNEP would be in a strong position to contribute to this process in close collaboration with FAO and the national and regional partners.

116. Finally, the reviewer would like to repeat the recommendation for a follow-up project. There is a unique opportunity to reinforce and broaden the impact of the project, in existing participating countries and new ones, and this momentum should be taken advantage of to reduce by-catches, improve fisheries management and support healthier ecosystems

ANNEX 1: TERMS OF REFERENCE OF THE MID-TERM REVIEW

TERMS OF REFERENCE

Mid-Term Independent Review of the UNEP GEF project
"Reduction of Environmental Impact from Tropical Shrimp Trawling, through the Introduction of By-catch Reduction Technologies and Change of Management"

UNEP GF/4030-02-04
FAO EP/GLO/201/GEF

1. PROJECT BACKGROUND AND OVERVIEW

Project rationale

Shrimp exploitation by tropical trawl fisheries generates significant amounts of non-shrimp by-catch. In some countries, by-catch has become an important source of income and contributes to food supply. In others, by-catch of fish, particularly small-sized, is discarded at sea. The capture of juveniles of valuable food fish constitutes a threat to the sustainable production of fish from an area. Extensive removal of non-target fish is also a threat to the biodiversity in a fishing area. If the introduction of fishing technologies and practices that reduce the capture of juveniles is successful in a few selected countries in various regions, it can be assumed that such technology and practices would be adopted by other shrimp fishing countries also experiencing problems with by-catch. In addition to the expected increased fish production and conservation of biodiversity as a result of project intervention, shrimp trawling will earn an improved reputation and so continue to produce needed export income for several poor developing countries.

The overall objective of the project is to reduce discards of fish captured by shrimp-trawlers, primarily by introducing in a selected number of developing countries, technologies that reduce the catch of juvenile food-fish and other by-catch.

The main objectives were stated as:

- Reduced by-catch taken by shrimp trawlers;
- Reduce capture of juvenile fish, particularly of species used for human consumption; and
- Increase knowledge on the impact of shrimp-trawling on marine habitat.

Relevance to GEF Programmes

This project was in conformity with the GEF Operational Strategy and Operational Programmes, in particular OP #9 - International Waters: Integrated Land and Water Multiple Focal Area, where there is a focus on an integrated management approach to the sustainable use of [land and] water resources on an area-wide basis. It also had relevance to OP #2 - Biodiversity in coastal and marine ecosystems, and specifically to aspects of eco-system management including elements of: targeted research, information-sharing, training, institutional-strengthening, demonstrations, and outreach (or 'extension').

Executing Arrangements

The proposal was to be executed by having a National Steering Committee (with a membership including representatives of the fishery managers, researchers, shrimp-fishers, non-shrimp-fishers, NGOs, *etc.* as appropriate) and a National Coordinator, to be involved on important issues regarding project implementation. Depending on the existing facilities/infrastructure in every participant country, and the work plan for the activities to be carried out by the project, FAO was to contract local or national

institutions to undertake specific works, or recruit directly experts and specialists as required. Also FAO was to organize external training activities or study tours (if necessary), or provision of equipment/materials.

Project Activities
The project duration is 60 months from February 2002 to January 2007.

The project had a total of eight components:

1. Inventory of by-catch reduction devices; legal and policy framework
2. Identification of problems of by-catch
3. Mapping of distribution of catches of target species and by-catch; determination of catch composition in different fishing grounds
4. Development and adoption of by-catch reduction technologies
5. Testing of by-catch reduction devices in industrial and artisanal fisheries
6. Testing of alternative fishing gears for shrimp fishing
7. Demonstration and training for fishers on by-catch reduction devices
8. Dissemination of the results to the fishing industry

Budget
The total budget was US$ 9,150,000 with US$ 4,780,000 funded by the GEF Trust Fund and co-funding from UNEP (in kind) US$ 110,000, Governments US$ 3,250,000 and FAO (in kind) US$ 1,010,000.

TERMS OF REFERENCE FOR THE REVIEW

1. Objective and Scope of the Review

At the mid-point of the project, the Review is intended to make recommendations for any necessary changes in the overall design and orientation of the project and make detailed recommendations on the work-plan for the remainder of the project.

The objective of this mid-term Review (MTR) is to assess operational aspects, such as project management and implementation of activities and also the extent to which objectives are being fulfilled. The Review will assess project performance and the implementation of planned project activities and planned outputs against actual results. *It will focus on corrective actions needed for the project to achieve maximum impact. Review findings will feed back into project management processes. Further, the report will provide specific guidance on plans to extend the project beyond its current planned closure in June 2008.*

Specifically, the Review will assess:

1. the continued relevance of the expected results, outcomes and objectives to the participating countries;
2. the quality of the outputs produced thus far, and their use by member countries;
3. the likely sustainability of any results/outcome so far and impact of the project. A measure of the project success would be an increased likelihood, since the project began, that desired impacts will be achieved. This could be due to various manifestations of interest shown in the project by countries, changes that have taken place in shrimp trawling regulation/practices, etc.

4. identify possible replication mechanisms, potentially involving more countries.
5. strengths and weaknesses of the project's management structure, operations, and the various partnership arrangements of the project (including the appropriateness of the execution means vis-à-vis the project objectives) and
6. consideration (and justification) for another similar project, with different or additional countries, perhaps more ambitious in scope.

2. Methods

This Mid Term Review will be conducted as an in-depth reflection of project progress and future priority actions. The consultant will liaise with the UNEP/EOU, the UNEP/DGEF Task Manager and the project's technical staff in FAO's Fishing Technology Service (FIIT) on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered.

A draft report will be prepared and circulated to UNEP - DGEF Task Manager, FAO FIIT technical staff, key representatives of the national executing partners, and the UNEP / EOU. Any comments or responses to the draft report will be sent to UNEP - EOU for collation and the consultant will be advised of any factual errors to be corrected.

The findings of the Review will be based on the following:

1. A desk review of project documents including, but not limited to:
   (a) The project documents, outputs, monitoring reports (such as progress and financial reports to UNEP and GEF annual Project Implementation Review reports) and relevant correspondence.
   (b) Review of specific products including the website .
   (c) Notes from the Steering Committee and other meetings.
2. Discussions with National Coordinators at their annual meeting, to be held in Manila in October 2006.
3. Consultation with stakeholder groups, especially private sector partners, during field visits to project locations in the Philippines Mexico and Nigeria.
4. Interviews with project management (such as Project Coordinators, the Executing Agency etc.).
5. Interviews and telephone interviews with other stakeholders, including NGOs which participated in the project. As appropriate, these interviews could be combined with an email questionnaire.
6. The Consultant shall determine whether to seek additional information and opinions from representatives of donor agencies and other organisations by e-mail or through telephone communication.

When possible, the consultant will provide recommendations for improvement of project performance in each of the six categories outlined in section 1 above, so that the project could incorporate the recommendations for the improvement of the project performance for the remaining duration of the project. The reviewer will also prepare a proposal for the development and application of indicators for project performance (see Annex 4).

3. Mid Term Review report format

The report should be brief, to the point and easy to understand. It must explain; the purpose of the Review, exactly what was evaluated and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should be presented in a way that makes the information

accessible and comprehensible and include an executive summary that encapsulates the essence of the information contained in the report to facilitate clear managerial responses.

Evidence, findings, conclusions and recommendations should be presented in a complete and balanced manner. The Review report shall be written in English, be of no more than 40 pages (excluding annexes), use numbered paragraphs and include:

i) An **executive summary** (no more than 3 pages) providing a brief overview of the main conclusions and recommendations of the review;
ii) **Introduction and background** giving a brief overview of the project, for example, the objective and status of activities;
iii) **Scope, objective and methods** presenting the purpose of the review, the assessment criteria used and questions to be addressed;
iv) **Project Performance and Impact** providing factual evidence relevant to the questions asked by the reviewer and interpretations of such evidence. This is the main substantive section
v) **Conclusions** of project implementation success giving the reviewer's concluding assessments. This section should present a concise synthesis of main findings in the preceding sections of the report and should draw conclusions regarding the relevance and adequacy of the project objectives and design, the efficiency in project execution and effectiveness in reaching the intended objectives (the production of outputs, the probable effects and impact, the sustainability and replicability), strengths and weaknesses of the design and implementation of the project, and the prospects for follow-up. The findings should provide a clear basis for the recommendations which follow.
vi) **Recommendations** suggesting actionable proposals regarding improvements that can benefit the project in its remaining lifespan. The reviewer shall make clear recommendations that primarily aim to enhance the likelihood of project impacts. Recommendations should always be clearly addressed to each one of the concerned parties, i.e. UNEP, the GEF, the host Government, the executing agency or the project management, as appropriate. They should be realistic, specific and stated in operational terms to the extent possible. A mid-term review should normally include a suggested workplan as an annex and should summarise major changes required in planned inputs and outputs and, if applicable, the outcomes required to meet the objectives.
vii) **Lessons learned** presenting general conclusions from the standpoint of the design and implementation of the project, based on established good and bad practices. Lessons must have the potential for wider application and use, and the wider context in which lessons may be applied should be specified;
viii) **Annexes** include a breakdown of actual expenditures against activities and the current status and expenditure relating to co-financing for the project. This information will be prepared in consultation with the relevant project Fund Management Officers at UNEP DGEF and FAO (see table attached in Annex 1 Co-financing and leveraged resources); terms of reference, list of interviewees, and so on.

The draft and final reports will be assessed for quality as set out in Annex 3. Review comments on the draft report will be shared with the consultant.

Examples of UNEP GEF Evaluation Reports are available at www.unep.org/eou

4. Submission of Final Mid Term Review Reports.

The final report shall be submitted in electronic form in MS Word format and should be sent to the following persons:

Segbedzi Norgbey, Chief, Evaluation and Oversight Unit
UNEP, P.O. Box 30552
Nairobi, Kenya
Tel.: (254-20) 624181
Fax: (254-20) 623158
Email: segbedzi.norgbey@unep.org

With a copy to:

Olivier Deleuze, Officer-in-Charge
UNEP/Division of GEF Coordination
P.O. Box 30552
Nairobi, Kenya
Tel: + 254-20-624166

Fax: + 254-20-624041/4042

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Takehiro Nakamura
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Janne Fogelgren
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The reviewer is fully responsible for the independent review report which may not necessarily reflect the views of UNEP, the GEF or FAO. The final review report will be considered as an 'internal document' with the circulation of the report to be determined by DGEF management.

5. Resources and schedule of the review

This review will be undertaken by an international reviewer, selected by the UNEP Evaluation and Oversight Unit. The contract for the reviewer will begin on 20th October 2006 and end on December31st 2006 (27 days) spread over 10 weeks study).

The review will be conducted in four phases.

- Preparation/background reading at home (1 day, early October).

- the Philippines to attend the National Coordinators' annual meeting, to be held in Manila in 8 – 16th October 2006 (8 days including travel).
- Field visits to Nigeria and Mexico (9 days including travel mid-November).
- A visit to FAO HQ 3 days including travel time
- report writing at home 6 days, and submission of first draft, mid-December.

The reviewer will submit a draft report on 15th December 2006 to UNEP/EOU, UNEP/DGEF, FAO FIIT and key representatives of the executing agencies. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultants will be advised of any necessary revisions. Comments to the final draft report will be sent to the reviewer by 22nd December after which, the reviewer will submit the final report no later than 31st December.

The reviewer will, after an initial telephone briefing with EOU and UNEP/GEF, travel and meet with project staff at the beginning of the review. The reviewer should have the following qualifications:

The reviewer should not have been associated with the design and implementation of the project, should be an international expert in fishing gear, marine biology and have experience with project evaluation. Knowledge of UNEP and FAO programmes and GEF activities is desirable. Fluency in oral Spanish and oral and written English is required.

6. Schedule Of Payment

The reviewer will receive an initial payment of 40% of the total amount due upon signature of the contract. Final payment of 60% will be made upon satisfactory completion of work. The fee is payable under the individual SSAs of the reviewer and is NOT inclusive of all expenses such as travel, accommodation and incidental expenses. Ticket and DSA will be paid separately.

In case, the reviewer cannot provide the products in accordance with the TORs, the timeframe agreed, or the products are substandard, the payment to the reviewer could be withheld, until such a time the products are modified to meet UNEP's standard. In case the reviewer fails to submit a satisfactory final product to UNEP, the product prepared by the reviewer may not constitute the review report.

Annex 1. Standard Terminal Evaluation issues (for reference only)

The following evaluation issues are applied to the terminal evaluation of UNEP GEF projects. The success of project implementation is assessed and rated with respect to the eleven aspects defined below. **These are provided for information and will be re-examined at a later stage during the terminal review of the project**.

A. Attainment of objectives and planned results:

The evaluation should assess the extent of progress towards the project's major objectives and whether such progress has been effectively and efficiently achieved. The "achievement" indicators provided in the log frame of the project document should be used together with the evaluation parameters described.

- Effectiveness: Evaluate how, and to what extent, the stated project objectives have been met (by components), taking into account the "achievement indicators" in the project logframe / project document. Relevance: Are the project's intended outcomes consistent with the focal areas/operational program strategies?
- Efficiency: Include an assessment of *outcomes* achieved to date in relation to inputs, costs, and implementation times based on the following questions: Is the project cost–effective? How does the cost-time vs. outcomes compare to other similar projects? Has the project implementation been delayed?

B. Achievement of outputs and activities:

A full and systematic assessment of the project's success to date in producing each of the programmed outputs, both in quantity and quality as well as usefulness and timeliness as compared with workplan and progress towards achieving the immediate objectives. Is the project on track?

C. Cost-effectiveness:

Cost-effectiveness assesses the achievement of the environmental and developmental objectives as well as the project's outputs in relation to the inputs, costs, and implementing time. It also examines the project's compliance with the application of the incremental cost concept. The evaluation will:

- Assess the cost-effectiveness of the activities of the project funded by GEF and whether these activities are likely to achieve the goals and objectives within the planned time and budget. How do the costs compare to the costs of similar projects in similar contexts?
- Assess the contribution of cash and in-kind co-financing to project implementation and to what extent the project has so far leveraged additional resources.
- Determine the extent to which scientific and technical information and knowledge have been incorporated within, and have influenced the execution of, the project activities.

D. Financial Planning and Control

Review of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. The evaluation should assess whether the use of project funds is commensurate with the attainment of physical progress, efficacy and the timeliness of procurement and disbursement activities and should:

- Assess the strength and utility of financial controls, including financial reporting, and planning. Are the financial management systems adequate to allow the project management to make informed decisions regarding the budget and allow

for a proper and timely flow of funds for the payment of satisfactory project deliverables?

- Verify the sources of co- financing as well as leveraged and associated financing (in co-operation with the IA and EA).

E. Impact:

Impacts (long term effects) stemming from project interventions can take time to be fully realised. Some effects, however, can be realised as a part of the implementation process. The evaluation will:

- Evaluate the immediate impacts of the project on the countries selected (if any);
- As far as possible, also assess and comment on the **potential longer-term impacts** of the project's interventions, considering that the evaluation is taking place at the mid term and that longer term impact is expected to be seen in a few years time. Frame recommendations to enhance future project impact in this context. Which will be the major 'channels' and required actions for longer term impact? The evaluation should formulate recommendations that outline possible approaches and necessary actions to facilitate the terminal evaluation and an impact assessment study in a few years time.

F. Sustainability:

Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the GEF project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, i.e. stronger institutional capacities, legal frameworks, socio-economic incentives / or public awareness. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes. The evaluation should ascertain to what extent follow-up work has been initiated and how project outcomes will be sustained and enhanced over time.

Five aspects of sustainability should be addressed: financial, socio-political, institutional frameworks and governance, ecological (if applicable), and replication[6]. The following questions provide guidance on the assessment of these aspects:

- *Financial resources.* What is the likelihood that financial and economic resources will be available such as the project outcomes/benefits will be sustained once the GEF assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and market trends that support the project's objectives)? Was the project was successful in identifying and leveraging co-financing.
- *Socio-political:* What is the likelihood that the level of stakeholder ownership will allow for the project outcomes/benefits to be sustained? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project
- *Institutional framework and governance*. What is the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for the project outcomes/benefits to be sustained? What is the relevance and applicability of the project's recommendations to federal and

[6] Replication refers to repeatability of the project under quite similar contexts based on lessons and experience gained. Actions to foster replication include dissemination of results, seminars, training workshops, field visits to project sites, etc. GEF Project Cycle, GEF/C.16/Inf.7, October 5, 2000

local authorities? While responding to these questions consider if the required systems for accountability and transparency and the required technical know how are in place.

- *Ecological.* The analysis of ecological sustainability may prove challenging. What is the likelihood that project achievements will lead to sustained ecological benefits?
- *Replication and catalysis.* What examples are there of replication and catalytic outcomes that suggest increased likelihood of sustainability? Replication approach, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographic area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources).

G. Stakeholder participation / public awareness:

This consists of three related and often overlapping processes: information dissemination, consultation, and "stakeholder" participation. Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the GEF-financed project. The term also applies to those potentially adversely affected by a project. The evaluation will specifically:

- Assess the mechanisms put in place by the project for identification and engagement of stakeholders and establish, in consultation with the stakeholders, whether this mechanism was successful, and identify its strengths and weaknesses.
- Assess the degree and effectiveness of collaboration/interactions between the various project partners and institutions during the course of implementation of the project.
- Assess the degree and effectiveness of any public awareness activities that were undertaken during the course of implementation of the project.

H. Country ownership / driveness:

This is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements. The evaluation will:

- Assess the level of country ownership. Specifically, the reviewer should assess the countries' level of commitment.

I. Implementation approach:

This includes an analysis of the project's management framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design, and overall project management. The evaluation will assess the efficiency of project organisation and management with respect to its size and composition, organisational structure, personnel management and policy, the qualifications of local staff and consultants. Specifically the evaluation will:

- Ascertain to what extent the project implementation mechanisms outlined in the project document have been followed. In particular, assess the role of the various committees established and whether the project document was clear and realistic to enable effective and efficient implementation, whether the project was executed according to the plan and how well the management was able to adapt to changes during the life of the project to enable the implementation of the project.

- Evaluate the effectiveness and efficiency and adaptability of project management and the supervision of project activities / project execution arrangements at all levels.
- Assess the effectiveness of supervision and administrative and financial support provided by FAO and UNEP/DGEF.
- Identify administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project.
- Assess whether the logical framework was used during implementation as a management tool and whether feedback from M&E activities more broadly was used for adaptive management.

J. Replicability:

- Assess whether the project has potential to be replicated, either in terms of expansion, extension or replication in other countries and/or regions and whether any steps have been taken by the project to do so and the relevance and feasibility of these steps. Specifically, the reviewer will develop recommendations for a possible replication mechanism, potentially involving more countries.

K. Monitoring and Evaluation:

The evaluation will consider the effectiveness of the M&E system (in defining performance indicators and collecting and analysing monitoring data on project progress) and follow-up on primary stakeholders' reactions to project activities.

- The evaluation shall include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The evaluation shall comment on how the monitoring mechanisms were employed throughout the project's lifetime, whether this allowed for tracking of progress towards project objectives and how the project responded to the challenges identified through these mechanisms. The tools used might include a baseline, clear and practical indicators and data analysis systems, or studies to assess results that were planned and carried out at specific times in the project.

Annex 2. Co-financing and Leveraged Resources

Co-financing (basic data to be supplied to the consultant for verification)

Co financing (Type/Source)	IA own Financing (mill US$)		Government (mill US$)		Other* (mill US$)		Total (mill US$)		Total Disbursement (mill US$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
– Grants										
– Loans/Concessional (compared to market rate)										
– Credits										
– Equity investments										
– In-kind support										
– Other (*) - - - - -										
Totals										

* Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

Leveraged Resources

Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector. Please briefly describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective.

Review of the Draft Report

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff provide comments on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. UNEP EOU collates the review comments and provides them (with an EOU commentary) to the reviewer for consideration in preparing the final version of the report. General comments on the draft report with respect to compliance with these TOR, are also shared with the reviewer.

Quality Assessment of the Evaluation Report

All UNEP GEF Mid Term Reports are subject to quality assessments by UNEP EOU. These apply GEF Office of Evaluation quality assessment and are used as a tool for providing structured feedback to the reviewer.

The quality of the draft evaluation report is assessed and rated against the following criteria:

GEF Report Quality Criteria	**UNEP EOU Assessment notes**	**Rating**
A. Did the report present an assessment of relevant outcomes and achievement of project objectives in the context of the focal area program indicators if applicable?		
B. Was the report consistent and the evidence complete and convincing?		
C. Did the report present a sound assessment of the potential sustainability of outcomes?		
D. Were the lessons and recommendations supported by the evidence presented?		
E. Did the report include the actual project costs (total and per activity) and actual co-financing used?		
F. Did the report include an assessment of the quality of the project M&E system and its use for project management?		
UNEP EOU additional Report Quality Criteria	**UNEP EOU Assessment**	**Rating**
G. Quality of the lessons: Were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
H. Quality of the recommendations: Did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?)'. Can they be implemented?		
I. Was the report well written? (clear English language and grammar)		
J. Did the report structure follow EOU guidelines, were all requested Annexes included?		
K. Were all evaluation aspects specified in the TORs adequately addressed?		
L. Was the report delivered in a timely manner		

GEF Quality of the TE report = 0.3*(A + B) + 0.1*(C+D+E+F)
EOU assessment of TE report = 0.3*(G + H) + 0.1*(I+J+K+L)
Combined quality Rating=(2* 'GEF EO' rating + EOU rating)/3
The Totals are rounded and converted to the scale of HS to HU

Rating system for quality of terminal evaluation reports

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1, and unable to assess = 0.

Annex 4 – Project Performance Rubric

Project proposal Logframe			Agreed Project performance indicators and targets					
Overall Objectives	Objectively Verifiable Indicators	Means of Verification (Monitoring focus)	Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
Reduced by-catch taken by shrimp trawlers	Reports by countries of reduced discard levels and non-capture of turtles or other key marine living resource (e.g. juvenile finfish)	Collection of data on catch rates and catch composition before and after introduction of any by-catch reduction device or any change in fishing operations	All countries show large substantiated reductions in by catch, some large in magnitude					No countries show a substantiated reduction in by catch,
Reduce capture of juvenile fish, particularly of species used for human consumption	Increased production of food fish in the fishing areas	Same as above, as well as an increase in landings of relevant fish species						
Increase knowledge on the impact of shrimp-trawling on marine habitat	Reports about quality and magnitude of distortion of bottom habitat caused by trawling	Changes in gears and fishing operations						

Outcomes								
Minimizing the pantropical problem of unwanted by-catch from shrimp trawling	Countries involved have assigned priority for research institutions and administration to solve the problem.	Evaluation of research and development programmes						
Introduction of appropriate fishing technology and practice	Number of vessels that change their fishing practice and adopt new technologies. Preparation of guidelines and manuals for applying the new techniques	Monitoring of vessels Dissemination of guidelines and manuals for applying the new techniques						
Enactment of relevant legislation and development of an improved management framework	Adopted and published regulations and laws	Adoption of regulations by the fishing industry						
Enhance awareness of the problem of shrimp by-catch	Increased demand for materials and publications on shrimp fisheries and by-catch; number of hits on web site to be maintained by FAO	Monitoring of number of documentation requests and replies; statistics on web-site visitors						
Increase dialogue, interaction and joint operations at the country and regional levels	Specific technical assistance provided by resource countries; number of joint activities implemented among participating countries	Monitoring and reporting of active participation and interactions among countries and resource countries						

Results								
Adoption of by-catch reduction devices by national and regional shrimp-trawling fisheries	Installation of devices in the shrimp-trawling gear	Reports of observers on use of by-catch reduction devices and on results of using them						
Improved management of shrimp-trawling fishery	Introduction of new management systems	Catch statistics by vessels and/or observer records						
Increased co-operation among countries in research on and management of the resources	Number of agreements between governments on fishery research (especially relevant to the problems addressed by the project)	Joint scientific publications; reports of relevant scientific meetings and conferences						
Better understanding of the interactions between fishing gear and environment	Number of new research programmes on environmental issues	Scientific reports and publications						

ANNEX 2: TRIP TO THE PHILIPPINES, INCLUDING FIELD TRIP TO CALBAYOG CITY (SAMAR PROVINCE)

PURPOSE AND SCOPE OF THE TRIP

The purpose of the travel to the Philippines was to participate in the Global National Coordinators Review Meeting, to interview the Project National Coordinators participating in this meeting, and to visit one of the project sites in the country (for discussions with project stakeholders and implementers). The local Project National Coordinator, Dr Jonathan Dickson, was accompanying the consultant and the other National Coordinators during the stay in the Philippines. The following is a summary of information collected and views expressed in the interviews carried out, in particular with regard to the project site Calbayog.

ITINERARY

City	***Date of arrival***	***Date of departure***	***Visits/meetings***
Rome (Italy)		7/10/2006	
Manila, Philippines	8/10/2006	12/10/2006	Global National Coordinators Review Meeting and interviews with National Coordinators. Meeting with UNEP representative.
Calbayog, Philippines	12/10/2006	14/10/2006	Meeting with the Mayor's office and project implementers. Sea trip and trawling trial (JTED). Discussions with boat owners and a skipper.
Manila, Philippines	14/10/2006	15/10/2006	Interviews with National Coordinators (*continued*) and with FAO Project Coordinators.
Halifax (Canada)	15/10/2006		

BACKGROUND

The marine fishery in the Philippines is categorised in two main categories:

- The municipal fishery consisting of boats of 3 GT or less operating in the coastal area < 15 km from the shoreline.
- The commercial fishery operating with larger boats outside the 15 km limit.

The project works with the commercial trawl fishery of which there are 356 registered vessels. This is however not a specialised shrimp fishery; boats target a larger range of commercially valuable fish and shellfish. Sometimes different nets are used with fish being targeted during daytime trips and shrimp trawling taking place at night. By-catch is rarely discarded although larger sized fish are generally preferred. Juveniles and small fish are also normally used (e.g. for aquaculture feed). A smaller proportion of the catch is classified as non-commercial 'trash fish' and discarded. The often large proportion of juveniles of commercially important fish species in the catches is of great concern.

In 1997, the shrimp production from the commercial vessels amounted to 7 156 tonnes and the municipal fishery sector produced 25 334 tonnes. Shrimps from capture fisheries are for local consumption while the aquaculture sector produces for export.

OVERVIEW OF PROJECT ACTIVITIES AND RESULTS ACHIEVED TO-DATE

Training and demonstration events, including sea trials, have been carried out in five major trawling grounds of the Philippines. As part of these activities, consultations with stakeholders were held and gear inventories carried out. Different types of JTEDs were tested in the sea trials and changes in catch recorded. The young/juvenile fish, trashfish and other by-catch escapement rate varied between 30 and 79 percent (by weight) depending on the fishing area and the type of device used. The training and demonstration exercises also allowed to raise the awareness of boat owners, government staff and other stakeholders of the importance of BRDs and to show how to use JTEDs. The project has made use of the support from SEAFDEC who organised one workshop on the use of JTEDs in the Philippines in 2004. Training material developed by SEAFDEC, in particular the short movies on VCD, have proved useful tools in the awareness raising and demonstration activities.

Following the initial activities, a pilot implementation project was started in one of the training/demonstration sites: Calbayog City in Samar province. A local technical working group was established – including industry representatives and local government officials – and all local trawlers (the number of which has recently decreased from eighteen to twelve) now use JTEDs. The pilot project continues to evaluate the performance of JTEDs and to work closely with the Local Government Unit who is also implementing a coastal zoning project. The coastal zoning project is a partnership activity between the Calbayog mayor's office, the fishing industry, coastal communities and neighbouring municipalities that has resulted in the establishment of a 'fishing highway' – delimitation of a trawl fishing area starting 8.1 km from the shore – improved monitoring, control and surveillance (MCS) to address illegal fishing, and decreased use of destructive gear and fishing methods. The implementation of the use of JTEDs has become an integral part of this initiative. A dramatic increase in catches and incomes has been reported thanks to the activities; boat owners interviewed by the reviewer claimed a 50% increase in income since the introduction of the JTEDs but it is difficult to separate the results of the BRDs from the impact of other management measures under implementation.

The results of the project so far include an improved understanding of the catch composition in the major trawl areas of the Philippines as well as the likely effect of the application of different types of JTEDs. Through the pilot implementation project in Calbayog, a model for how to implement improved management of the trawl fishery is in the process of being developed with important lessons-learnt generated already, e.g. with regard to the importance of an integrated management approach and the direct involvement of the industry and other stakeholders.

EXPECTED END-OF-PROJECT RESULTS

The results of the pilot project in Calbayog in combination with the costal zoning experience will serve as a model for improved trawl fishery management, including the use of JTEDs, in other major trawl fishing grounds in the country. Demonstration in other sites will have been carried out and the level of awareness and knowledge among stakeholders regarding the use of JTEDs will have been considerably improved. The project experience will also form the basis for the formulation of nation-wide recommendations on the introduction of BRDs and improved management. A national policy on the use of BRDs by commercial trawlers will have been adopted at the end of the project.

In Calbayog, the project will take the initiative to draft revised local regulations and to develop a local management plan in collaboration with the coastal zoning initiative. These activities will be carried out in a process of stakeholder consultations and training. By end-of-project, a new municipal regulation on BRDs will have been approved and be under implementation. The aim is to reduce the catch of juveniles of commercially valuable fish by 40 percent in Calbayog.

SUSTAINABILITY AND REPLICABILITY

Since the trawlers in the Philippines – as well as in other Southeast Asian countries – are generally not dedicated shrimp trawlers and since by-catch is mostly wanted and used, the incentives for the industry to use BRDs is limited. Nevertheless, the industry would rather catch large fish than small and recognises that if juveniles are left to grow, they can be caught at a later time fetching a better price. However, for this to be valid for the individual fisher it is necessary to also introduce a management system in which the industry trusts. The apparent success of the Calbayog pilot project would probably not have been achieved in isolation from the coastal zoning initiative and the direct participation of the stakeholders that this has entailed. The project staff are well aware of this fact and wider management aspects will be included in the replication activities and policy formulation.

When the project ends, gear development and testing of further improvements of BRDs will continue under the regular national budget, possibly in combination with other projects for fisheries management. Funding is expected to be available for the general promotion of the use of JTEDs but a nation-wide implementation and enforcement of new BRD regulations may prove more difficult to achieve in the short-term. The willingness of the industry to use BRDs on a voluntary basis will hence be of importance for the overall impact of the project.

OPERATIONAL AND ADMINISTRATIVE ISSUES

At the beginning of the project, an international meeting was held in FAO, Rome, to discuss its implementation with all the participating countries. The advice given and support to setting national objectives at inception were found to be insufficient and project staff feel they have not known what has been expected from them with regard to activities and results in the Philippines. Technical support has been given by FAO and by SEAFDEC and this has been adequate. However, more clearly defined indicators, closer monitoring and feedback regarding achievements as well as more inter-regional technical exchanges would be desirable (the possible introduction of *suripera* fishing gear as used in Mexico for the Philippine artisanal fishery is currently being looked into).

No delays or other problems with regard to fund transfers and other administrative matters have been noted. The project operates through financial allotment advices administered by the local FAO office.

A NEW PROJECT?

If a new project were to be implemented, the following components and activities could be considered:

- Inclusion of new countries in the region (e.g. Cambodia, Malaysia, Myanmar and Vietnam).
- Further development and improvement of gear.
- Inclusion of the small-scale/artisanal fishery.
- Addressing enforcement issues.

ANNEX 3: FIELD TRIP TO MEXICO

PURPOSE AND SCOPE OF THE TRIP

The purpose of the travel to Mexico was to visit two of the project sites and to discuss with project participants from the private industry as well as with government counterpart agencies. During the stay, the consultant was accompanied by the Assistant Project National Coordinator, Mr Ignacio Mendez. The following is a summary of information collected and views expressed in the interviews carried out.

ITINERARY

City	***Date of arrival***	***Date of departure***	***Visits/meetings***
Halifax (Canada)		12/11/2006	
Mexico City	12/11/2006	13/11/2006	Visit to National Institute of Fisheries (INP) and discussions
Mazatlan	13/11/2006	15/11/2006	Visit to *Comision Nacional de Aquacultura y Pesca* (CONAPESCA) and discussions Visit to harbour and discussion with skipper Visit to supplier of net materials Discussions with net maker/project technology consultant Discussions with boat owner/export company
Huatulco/Salina Cruz	15/11/2006	16/11/2006	Visit to regional office of INP Visit to harbour and discussions with boat owner and skippers (using new nets) Discussions with Fisheries Department of Oaxaca State Government
Mexico City	16/11/2006	17/11/2006	*Transfer*
Halifax (Canada)	17/11/2006		

BACKGROUND

There are about 2 000 shrimp trawlers in Mexico. Some 1 100 boats are fishing on the Pacific coast and the remaining 900 are based on the Atlantic side in the Gulf of Mexico. In Mazatlan in Sinaloa province on the Pacific coast, the main fishing port, about 600 shrimp trawlers are based. Shrimp is also fished by the artisanal fishing fleet and on the Pacific coast it is estimated that there are some 10 000 artisanal craft operating. However, these are generally multipurpose boats, targeting shrimp among other species. On the other hand, the industrial fleet focuses on shrimp and by-catch is generally not used or wanted, and hence discarded (with the exception of large fish that accrue to the crew).

TEDs are mandatory and exports of shrimp to the United States are important to the industry. However, the industry complains that international prices are low while their costs (in particular fuel) are increasing. There is also increased competition from the aquaculture industry.

In the industrial fishery, boat owners do not generally fish but employ skippers and crew. Decisions on gear and investments are however taken by the boat owner who may be influenced by the skipper.

OVERVIEW OF PROJECT ACTIVITIES AND RESULTS ACHIEVED TO-DATE

The project targets the industrial fleet and does not work with the artisanal sector. Project activities build on work already carried out by the Mexican government and the INP on BRDs and gear development and have so far been mainly implemented on the Pacific coasts. Two experimental trips for testing BRDs have been completed. A third trip had to be cancelled due to bad weather (hurricanes) and will be resumed early 2007. A fourth trip is also scheduled for next year. The trips take place in different fishing areas of the Pacific coast. Activities in the Gulf of Mexico will follow after the trials on the Pacific coast have been completed.

The gear and devices tested include trawl nets of new material with slightly different design and bigger mesh (2"1/4 instead of 2" or 1"3/4 depending on the area), fish eye (double or single), double foot rope and double cover TEDs. The results so far show that:

- By-catch is reduced (25-70% reduction depending on combination of devices) and the quality of the shrimp catch is improved, i.e. larger size shrimp.
- The new nets, which are lighter than the old ones, decrease fuel consumption by some 30%.
- Work onboard, i.e. sorting of catch, has become easier and is quicker.

The industry takes a great interest in the new nets considering the reduction in fuel consumption. Some 100 vessels are using new nets (with or without the BRDs) on a voluntary basis. A few have received funding through a Government gear replacement programme for investing in the new nets. The new netting material is however expensive and some boat owners are switching to new nets but of cheaper material (and not necessarily of the design and with the devices proposed by the project).

In addition to the sea trials, a number of meetings and workshops have been held for researchers, government officials and private stakeholders, including training on the operation of onboard electronic equipment and on shrimp trawl design. Relevant equipment has been purchased through the project for the INP research vessels, including fish finder, navigation system, echo sounders, trawl and catch monitoring systems, and sea floor mapping instruments. Mexico is also providing technical assistance to neighbouring countries, including Colombia, Costa Rica, Cuba, Trinidad and Tobago, and Venezuela.

The mandatory use of BRDs has been introduced in National Protected Areas and new regulations with regard to TEDs have been put in place. As soon as the final trials of the new nets/devices are finalised for the Pacific coast, the results will be submitted as a proposal for new standards for the shrimp trawl fishery. Nevertheless, already at this point in time, there is a good understanding of the technical specifications required.

EXPECTED END-OF-PROJECT RESULTS

At the end of the project, it is expected that:

- the new standards for nets and BRDs have been become formalised and are under implementation for the Pacific fishery.
- the technical specification of nets and BRDs for the Gulf of Mexico have been finalised through sea trials and the process for its legalisation has been initialised (but the actual formal adoption of the new standards may take place after end-of-project)

- an increased number of fishers are using the new nets and BRDs on a voluntary basis (also before it is legally required).

When using the new nets and devices, the by-catch reduction is calculated to be at least 30%, possibly up to 40-50%. In addition, there is an expected decrease in fuel consumption of around 30%. The exact effects will depend on the combination of gear used (improved net, single or double fish eye, double foot rope and double cover TED).

SUSTAINABILITY AND REPLICABILITY

The project activities are well integrated into regular national activities and will continue after the completion of the project. Research on improved nets and BRDs had started already before the project, which has allowed to consolidate the efforts to develop new net designs/devices. The project is also politically important since the recommendations for changing standards and regulations will carry more weight when supported by FAO.

In the industry, there is generally a resistance to change but boat owners are motivated by financial gains to use new gear. The new net design and material, which decrease by-catch together with the BRDs, also reduces fuel consumption and this is the most important incentive for the fishers to adopt the new technologies. The larger mesh size and change of codend material also allow for better quality shrimp to be caught (bigger size and less damage) . Hence, while the introduction of the new nets is likely to be easy, it may prove more difficult to introduce the use of BRDs. Legislation and enforcement are likely to be required unless the devices are proven to enhance the quality of the shrimp and do not entail loss in shrimp catch. The experience from the TEDs show though that such devices can be introduced and are being used by the industry. Nevertheless, the willingness of the industry to use BRDs needs to be confirmed and proper training, awareness building and means of enforcing the new regulations and standards when they take effect should be part of the implementation process for the new gear.

If gear is introduced that increases the efficiency of the fishery, care has to be taken not to increase fishing effort beyond the carrying capacity of the resources. There is currently a buy-back programme in place and new licences are not issued as measures to limit fishing capacity. The industry would like to see more strict management, including the regulation of the artisanal fishery and closed areas to allow shrimp to grow to larger size, fetching higher prices in international markets, before being caught.

While it is recognised that different fisheries, boats and fishing areas require customised gear solutions, general designs and lessons-learnt can be transferred to other areas and fisheries. The experiences from the Pacific coast will feed into the work to be carried out in the Gulf of Mexico and the Mexican experience is useful for many other countries in the region and even internationally. The Philippines has asked for assistance from Mexico in introducing the environmentally friendly *suripera* technology for their small-scale sector While the situation of the artisanal fishery is considerably different from that of the industrial trawl fleet – and more complex and complicated – it is believed that the experience gained from the project will also be useful when – in the future – working with the artisanal sector on gear selectivity, BRDs and fisheries management.

The netting material used in the experimental gear, and which is the material that is now being promoted by the government, is of high quality but expensive. It is imported (from the United States), only sold by one company and the availability in the Mexican market is limited. There are substitutes but since these materials have not been tested, their performance has not been evaluated and is hence not known. However, once the new nets become more widely used, it would seem likely that market forces will adjust supply to demand (and substitute material be evaluated by the use of the private sector).

While the inter-regional cooperation provided through the project is appreciated, it is felt that the regional collaboration is more important from a technical point of view. The BRDs used in Southeast Asia or in

Africa are not immediately suitable for the Latin American / Caribbean region. However, the technical support and advice provided by FAO – through staff and consultants – have been useful.

OPERATIONAL AND ADMINISTRATIVE ISSUES

The National Project Steering Committee is the same group as the *Comite Consultivo Nacional de Normalizacion de Pesca Responsable* and is hence well placed for processing and bringing forward the results of the project to relevant authorities and legislators. The project has also worked closely with the industry and project management appears to have a good understanding of the views, constraints and opportunities of the fishers. This type of consultative process is not unique to the project but was established already before its start.

The project was considerably delayed at the beginning due to confusion with regard to how to transfer funds from FAO to the project counterpart institutions. This issue was solved and the project now operates through allotment advices administered by the FAO Representation in Mexico City. Sometimes there are delays in the delivery of funds and equipment but these do not constitute major obstacles to project implementation.

A NEW PROJECT?

If a new project were to be implemented, the following components and activities could be considered:

- A continuation of the testing of new gear and devices, e.g. experiments with other (less expensive) netting materials.
- Inclusion of the artisanal fishery.
- Inclusion of other countries in the Latin American/Caribbean region (of which some have participated in regional meetings and several have expressed their interest in the project).
- Improved research to support management, e.g. the closure of areas and the regulation of fishing seasons (area specific measures would be desirable).

ANNEX 4: FIELD TRIP TO NIGERIA

PURPOSE AND SCOPE OF THE TRIP

The purpose of the travel to Nigeria was to participate in the Post-certification – TEDs and BRDs – Workshop on 29-30 November 2006 and to hold discussions with project participants from the private industry – representatives of the shrimp trawl companies and other stakeholders – and the government counterpart agencies. During the stay, the consultant was accompanied by the Project National Coordinator, Mr James Ogbonna, and the Project Fishing Gear Scientist, Dr Boluwaji Solarin. The following is a summary of information collected and views expressed in the interviews carried out.

ITINERARY

City	*Date of arrival*	*Date of departure*	*Visits/meetings*
Halifax (Canada)		26/11/2006	
Lagos	27/11/2006	1/12/2006	Visits to Nigerian Institute for Oceanography and Marine Research / NIOMR and Lagos Annex, Department of Fisheries, Federal Ministry of Agriculture and Rural Development (FDF). Discussions with representatives of the private shrimp trawl industry- Participation in workshop (NIOMR). Visit to fish market.
Rome (Italy)	2/12/2006		*For debriefing*

BACKGROUND

In Nigeria, 240 shrimp trawlers are licensed to fish beyond the five miles delimiting the inshore area reserved for the artisanal fishery. There are an estimated 35 000 artisanal fishermen fishing shrimp. The Niger Delta area is particularly important for shrimp fishing. This is also the major oil production area and oil spills and related pollution is a growing concern for the fishery resources.

The shrimp trawlers belong to 22 fishing companies and almost all boats are based in Lagos. The major share of the shrimp caught is sold to Europe. There are generally foreign interests invested in the companies and they are also often managed by foreigners or non-native Nigerians (Indians). By-catches are important and generally fully utilised, either landed (frozen) and sold in the local market or sold and transhipped by crew to smaller fishing boats. In value, shrimp make up some 20-25 percent of the value of the landed catch while fish contribute 75-80 percent. About 7 000 tonnes of shrimp are exported per year, yielding some USD 50 million in export earnings. Nigeria is also a major fish importer with an estimated 560 000 tonnes coming into the country annually.

The main problems the industry are facing include increases in fuel prices, decreasing shrimp prices in international markets and piracy. Lately, armed robberies of shrimp trawlers appear to have increased dramatically, hampering the shrimp trawl operations. Companies claim to have to restrict their fishing efforts to areas considered safe. The exact reasons behind the attacks are unclear but most likely related to the militant movement in the Niger Delta. Moreover, claims are being made that trawlers attract the

pirates by their own actions, e.g. fishing too close to the shore and carrying cash for illegal trade. With regard to fuel prices, subsidisation by the government is under discussion.

Nigeria used to export to the United States (US) but lost its certification in 2004.

OVERVIEW OF PROJECT ACTIVITIES AND RESULTS ACHIEVED TO-DATE

The project works closely with the shrimp trawling companies, individually and through the Nigerian Trawler Owners' Association (NITOA). Work on TEDs for the recertification for the American market had started before the project and became one of its main focuses. The project also works on the development and testing of BRDs for exclusion of juveniles and redefinition of the codend mesh size. An observer programme has been implemented to improve the knowledge of catch and by-catch composition and use. A study is under way to better understand the socio-economic importance of by-catch and the possible implications of its reduction. Various training events, demonstration activities, workshops and meetings have taken place and the activities have been carried out in close collaboration with the industry. Regular meetings with the industry have been introduced to discuss Monitoring, Control and Surveillance (MCS). Some project activities have been carried out in close collaboration with Cameroon. The main outputs of the project so far include:

- Recertification for the US market under way (official confirmation awaited any time).
- BRDs tested through trials during one-day fishing trips in Lagos West and three suitable models defined: (i) square mesh codend, (ii) square mesh window, and (ii) 90 degrees turned codend.
- New regulations in place for TEDs, BRDs and codend mesh size (minimum 44 mm) for shrimp trawls. The amendment of the Fishing Regulations took effect in August 2006.
- Increased awareness and knowledge on the need for and use of BRDs on behalf of the industry.
- Better knowledge and data on catches/by-catches and their utilisation.
- 49 data collectors trained and a system for continuous shorebased data collection in place.
- A partnership established between the government and the fishing industry allowing for open dialogues and discussions on issues also outside the scope of the project.
- Formal agreement at project level with Cameroon to harmonise the fishing regulations and MCS of the two countries and a workshop planned for January 2007 to start similar discussion with eight other shrimp fishing countries in the southern part of the Gulf of Guinea.

The project has also supplied essential equipment to NIOMR, e.g. a vehicle, computers, freezer (for samples), etc.

EXPECTED END-OF-PROJECT RESULTS

In addition to the results achieved already, it is expected that the following activities will have been completed and outputs produced by the end of the project:

- Formal confirmation of the US recertification.
- Finalisation of the socio-economic study and improved knowledge of the likely impact of a by-catch reduction on those making a living on collection and trade of the produce today. Alternative employment opportunities and the need for mitigating measures will also have been explored.

- Further refinement of the technical aspects of BRDs through trials during longer commercial fishing trips.
- Further increased knowledge by the industry on the use of BRDs and 40 percent of the vessels using the device.
- By-catches reduced by up to 40 percent by those vessels using the device.

SUSTAINABILITY AND REPLICABILITY

While the industry claims to understand the need for protecting the environment (e.g. turtles) and the logic in letting small fish grow larger before they are caught, there is no immediate financial incentive to use the new devices, except for the US certification that requires TEDs. Captains interviewed sometimes complained about the loss of time in rigging the TED properly and shrimp losses of 7-10 percent. They also explained that few turtles had been caught even before TEDs were introduced but admitted that accidental catches stop when using TEDs. Nevertheless, in spite of strong initial resistance to TEDS, it appears that shrimp trawlers are now using them. Demonstrations and training – both for boat owners and crew – have been essential for reaching this result. Since the devices are mandatory according to the revised regulations, boat owners expressed confidence in that the TEDs will continue to be used and so will the BRDs once they have been introduced through demonstrations and training. The heavy penalties for boats caught not using TEDs/BRDs is also discouraging non-compliance.

However, the possibilities of the Federal Department of Fisheries (FDF) to enforce the regulations are difficult to assess. Problems also appear to exist with regard to trawlers fishing illegally in inshore area. Efforts are currently being made to improve the capacity and capabilities in the field of MCS and the project is working on this initiative with FDF. Improvements that are being sought by the department include the introduction of a Vessel Monitoring System (VMS), use of 'co-management' (co-surveillance) approaches by which the industry is encouraged to supervise each other, the dissemination of information regarding regulations and 'black lists' of non-compliant companies through a news letter, and the establishment of a surveillance platform, including the necessary equipment, under the authority of the department. Currently, FDF makes request to the navy when interventions are required.

The role of the navy was discussed – in the workshop on 29 November 2006 – in relation to the issue of the increased piracy, or sea robbery, incidents involving fishing vessels. The representative of the navy suggested a co-financing mechanism (including other government departments and the industry) to allow them to better serve the fishing industry. No conclusions on this important issue were reached but all parties expressed willingness to work together to find a solution to the piracy problem although blame was also passed around. At the moment, the issue of piracy is overshadowing all other concerns and its solution would appear to also be of relevance to the future monitoring and surveillance of law compliance by fishing vessels with regard to TEDs/BRDs.

Although the confirmation of recertification for the US market has yet not been received, it is expected to be received. With an additional market to supply, care has to be taken so that fishing pressure does not increase in an unhealthy manner in order to increase production for this new market.

Project activities are well integrated into the work of NIOMR and FDF who are assuming full ownership of the work. While certain activities will not be continued without project funding, e.g. regular socio-economic field surveys and the already completed at-sea observer programme, it would appear that NIOMR and the department have the staff resources (including fishing technologists and social scientists) to ensure a general continuation of the initiatives started.

Considering the shared waters and fishery resources in the Gulf of Guinea, cooperation between all countries utilising these resources is important. As mentioned above, discussions are under way with

Cameroon for the harmonisation of fishing regulations and MCS and a similar initiative has been taken for other countries in the region. It would appear that the experience gained in Nigeria could be useful in the development of BRD technologies and regulations in neighbouring countries (although the current local situation in these countries is not known).

It is also noted that the opportunity for international exchanges of experiences and technologies that the project has provided appears appreciated and useful. For example, the methodologies used for the socio-economic study in Trinidad and Tobago have provided inputs into the questionnaire used for the Nigerian work on the same issue. With regard to BRDs, the international exposure to different techniques has allowed Nigeria to evaluate a variety of existing devices before deciding what is likely to be most suitable for local conditions.

OPERATIONAL AND ADMINISTRATIVE ISSUES

The project operates through Letters of Agreement (LOA) between FAO Rome and NIOMR and FDF. Certain expenses are paid through the FAO Representation in Abuja. The involvement of the local FAO office has been limited, at least partly caused by the vacancy of the FAO representative post until October 2005. The project has generally communicated directly with Rome but the local FAO office is likely to become more involved in monitoring and new procedures for, for example, forwarding project reports via the FAO Representation have recently been agreed upon.

After the project budget was drawn up four years ago, prices as well as the rates for government allowances for staff travelling in-country – also applied by the project – have increased more than expected. This has had implications for some of the activities and the socio-economic study that was started recently has had to reduce travel and time spent in the field by data collectors and researchers. NIOMR and FDF make in kind contributions to the project through staff time but do not have a general budget for support in cash.

The visit by the FAO Project Operations Officer and his meeting with the Minister of State for Agriculture and Rural Development in September 2006 was much appreciated. Visible support by FAO to the project and related initiatives is important for the political acceptance and support for project activities and objectives. It is noteworthy the Minister participated in the opening session of the Recertification – TEDs and BRDs – Workshop on 28 November 2006.

A NEW PROJECT?

If a new project were to be implemented, the following components and activities could be considered:

- Extension of project activities to neighbouring countries, i.e. notably shrimp trawling nations in the southern part of the Gulf of Guinea.
- MCS
- Further review of the potential socio-economic consequences of by-catch reductions and the need for mitigating measures
- Support to the further implementation and introduction of BRDs (demonstrations, training, workshops, etc)
- Shrimp fisheries management in a wider context, including stock assessments and socio-economic aspects, and covering both the industrial and the artisanal fisheries.

ANNEX 5: PERSONS MET

MEXICO

Dr Guillermo Compeán, Project Coordinator (Director, Instituto Nacional De La Pesca / INP)
Mr Ignacio Mendez (Director-General de Investigacion Pesquera En El Pacifico Sur, INP)
Mr Andrés Antonio Seefó Ramos, Fishing Technologist (Sub-Director De Tecnología, INP) (met in Manila, Philippines)
Mr Raul Villaseñor, Technical Secretary Project Steering Committee and National Committee for Responsible Fisheries Standards (Director Sports Fishing, Comision Nacional de Aquacultura y Pesca / CONAPESCA, Mazatlan)
Mr Rafael Basto Beserra, Project Regional Consultant (Fishing technologist/trader, Mazatlan)
Mr Fernando Medrano Freeman (boat owner/shrimp exporter, Mazatlan)
Mr Antonio (skipper, shrimp trawler, Mazatlan)
Mr Oswaldo Morales Pacheao (Sub-director of Administration and Economic Analysis, Regional INP Office, Salina Cruz)
Mr Eduardo Ramos Santiago (Researcher, Regional INP Office, Salina Cruz)
Mr Miguel Angel Baldenebro Valeuzuela (Subsecretaría de Pesca y Acuacultura, Oaxaca State Government, Oaxaca) (met in Salina Cruz)
Mr Magdaleno Maldonado Ventura (boat owner, Salina Cruz)
Mr Marcelino Perez Barcelo (skipper, Salina Cruz)
M Javier Lopez Perez (skipper, Salina Cruz)

NIGERIA

Mr James Ogbonna, National Coordinator (Deputy Director of Fisheries, Federal Ministry of Agriculture and Rural Development)
Dr Boluwaji Solarin, Fishing Gear Scientist (Assistant Director, Nigerian Institute for Oceanography and Marine Research / NIOMR)
Dr B.I. Ezenwa (Executive Director, NIOMR)
Dr O.A. Ayinla, Director (Bio/Fishtech) (NIOMR)
Mr Phillips Amiegheme (acting Director Department of Fisheries, Federal Ministry of Agriculture and Rural Development / FDF, Abuja)
Dr Akinsola V. Amire (Deputy Director, FDF, Lagos Annex)
Mr E.E. Edit (Assistant Director / MCS, FDF, Lagos Annex)
Mrs B.A. Kupolati (Chief Fisheries Officer / Planning and Evaluation, FDF, Lagos Annex)
Ms Parcy Ochuko Abohweyere (Fisheries Economist, NIOMR) *and*
members of staff carrying out the project socio-economic study.

Owners, managers and captains of the following shrimp trawling companies:

- Karflex Fisheries Ltd (5 shrimp trawlers)
- ORC Fishing Company (15 shrimp trawlers)
- Atlantic Shrimpers Ltd (71 shrimp trawlers)
- Banarly Group (24 shrimp trawlers)
- Honeywell Fisheries Ltd (9 shrimp trawlers)
- Seabless Fishing Company Ltd (10 shrimp trawlers)

Participants in the 2-day Post-certification – TEDs and BRDs Workshop:
Ms Amber. A. Aura (Political/Economic Officer, United States Consulate General, Lagos)
Ms Abdeola Akinrinlola (Program Assistant, FAO, Abuja)
Mr Nenibarini Zabbey (Head Conservation Programme, Centre for Environment, Human Rights and Development / CEHRD, Eleme, River States)
Ms Deaconess Foluke O. Areola (National President, Fisheries Society of Nigeria)
NN Captain A.O.A Ikioda (Commanding Officer MNS Bearcraft)

PHILIPPINES
Dr Jonathan O. Dickson, National Coordinator (Chief, Capture Fisheries Division, Bureau of Fisheries and Aquatic Resources)
Mr Rafael V. Ramiscal (Supervising Aquaculturist, Bureau of Fisheries and Aquatic Resources)
Mr Efren V. Hilario (Aquaculturist, Bureau of Fisheries and Aquatic Resources)
Mr Mel Senen S. Sarmiento (Mayor, Calbayog City)
Mr Ronaldo Aquino (Vice-Mayor, Calbayog City)
Ms Angelica T. Realino, Co-chair JTED Techncial Working Group (Chief Fisheries Division, Calbayog)
Ms Merla Abarquez-Rosalado (Documentor, City's Special Projects, Calbayog)
Mr Apolinario Catarus (boat owner, Calbayog)
Ms Matilda C. Merencillo (boat owner, Calbayog)
Ms Herbita S. Montiman (boat owner, Calbayog)
Mr Hendrik D. Balareit (boat owner, Calbayog)
Mr Greg P. Jusayan (boat owner, Calbayog)
Mr Fulicisimo Gonesio (boat owner, Calbayog)
Mr Edelbesto Smilla (master fisherman, Calbayog)

FAO
Mr Janne Fogelgren, Project Operations Coordinator
Mr Thomas Moth-Poulsen, Project Coordinator (technical)
Dr Mr. Blaise Kuemlangan, Project Legal Advisor (Legal Officer)
Mr Jeremy Turner (Chief, Fishing Technology Service / FIIT)

ADDITIONAL PERSONS MET / INTERVIEWED IN MANILA, PHILIPPINES

CAMEROUN
Mr Oumarou Njifonjou, National Coordinator (Ministry of Livestocks and Fisheries and Animal Industries)
Dr Meke Soung Pierre Nolasque (Fishing Activities Control and Surveilance Brigade, Ministry of Livestocks, Fisheries and Animal Industries / MINEPIA)

COLOMBIA
Dr Mario Enrique Rueda Hernández, National Coordinator (INVEMAR)

COSTA RICA
Mr Antonio Porras, National Coordinator (Director General Tecnico Instituto Costarriceuse de Pesca y Acuicultura / INCAPESCA)

CUBA
Mr Luis Font Chávez, National Coordinator (Fishery Ministry)

INDONESIA
Mr Tyas Budiman, National Coordinator (Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries / MMAF)
Mr Imron Rosyidi, Assistant Project Coordinator (MMAF)
Mr Imron Rosyidi, Assistant Project Coordinator (MMAF)

TRINIDAD AND TOBAGO
Ms Suzette Soomai, National Coordinator (Fisheries Officer, Ministry of Agriculture Land and Marine Resources)

VENEZUELA
Mr José Javier Alió, National Coordinator (Researcher, National Institute Agricultural Research)
Mr Luis Marcano (Instituno Nacional Investi Agricola)

SEAFDEC
Mr Bundit Chokesanguan (Head of Information and Extension Division, Training Department)
Mr Suppachai Ananpungsok (Training Department)
Mr Mokkara Punchuen (Training Department)

UNEP
Mr Takehiro Nakamura (UNEP/GEF SPO International Waters) (met in Manila, Philippines)

ANNEX 6: PROJECT PERFORMANCE RUBRIC

Project Document Logframe			Comments on Project Performance and Indicators *(new proposed end-of-project targets in italics)*
Overall Objectives	**Objectively Verifiable Indicators**	**Means of Verification (Monitoring focus)**	
1. Reduced by-catch taken by shrimp trawlers	50% reduction of discards[7] Reports by countries of reduced discard levels and non-capture of turtles or other key marine living resource (e.g. juvenile finfish)	Collection of data on catch rates and catch composition before and after introduction of any by-catch reduction device or any change in fishing operations	By-catch reductions have been demonstrated in most participating countries but on a trial basis or by a smaller segment of the industry using BRDs on a voluntary basis. TEDs are mandatory in some countries and used by the industry. In Nigeria, the project has contributed extensively to the reintroduction of TEDs and all shrimp trawlers are apparently fitted with the device. While the identification, development and testing of suitable BRDs are well under way in most countries, an important challenge will be the wider application of the devices by the industry. Economic incentives to the industry only exist in countries where by-catches are not utilised and without market value. Only a few countries will have reached the stage where the use of BRDs is being implemented across the industry at end-of-project and a 50% a reduction of by-catch overall is likely to be an overly optimistic target. • *Total by-catches by the shrimp trawl fleets in participating countries reduced by at least 5%.*
2. Reduce capture of juvenile fish, particularly of species used for human consumption	Increased production of food fish in the fishing areas	Same as above, as well as an increase in landings of relevant fish species	While assuming that a reduction of by-catches – including of juveniles of commercially valuable species – will lead to increased abundance of larger size food fish in the longer term, it will be difficult to measure this impact at end-of-project. Only in a few places will BRDs have been in use for any length of time by a large enough share of the trawler fleet to start to have an impact on stocks. It will also be difficult to separate the effect of the project from other impacts on the fisheries. Where data on landings exist or sampling of landed fish can be carried out in relevant areas, indications could possibly be obtained that sizes and landings of fish are stable: • *Sizes and landings of food fish in shrimp trawling areas where BRDs are used stable or improved.*
3. Increase knowledge on the impact of shrimp-trawling on marine habitat	Reports about quality and magnitude of distortion of bottom habitat caused by trawling	Changes in gears and fishing operations	This objective has not been addressed by project activities. Changes in gear proposed and introduced by the project have been evaluated with regard to its impact on catches and economic efficiency of operations – in accordance with the main focus of the project – and not on the bottom habitats. While the issue of damage to bottom habitats is important, it is felt that it may not belong to the project considering its current scope and budget. If to be addressed, countries could review existing information on the issue and prepare reports to serve as a basis for an evaluation of the need to address marine habitats at a later stage or under a different project arrangement. • *Issues and concerns with regard to the impact of shrimp trawling on marine habitats in project areas identified.*

[7] Not in original logframe but mentioned in the main text of the project document.

Project Document Logframe (cont.)			Comments on Project Performance and Indicators *(new proposed end-of-project targets in italics)*
Outcomes	**Objectively Verifiable Indicators**	**Means of Verification (Monitoring focus)**	
1. Minimizing the pantropical problem of unwanted by-catch from shrimp trawling	Countries involved have assigned priority for research institutions and administration to solve the problem.	Evaluation of research and development programmes	Many of the participating countries were carrying out limited experiments with BRDs before the project that became an integral part of existing work programmes and allowed for a consolidated and technically sounder approach to BRD experiments and introduction. Work is likely to continue after project completion in several countries. • *Workplans and budgets of relevant institutes include continued research on by-catch reduction in at least half the participating countries for the period after June 2008.*
2. Introduction of appropriate fishing technology and practice	Number of vessels that change their fishing practice and adopt new technologies. Preparation of guidelines and manuals for applying the new techniques	Monitoring of vessels Dissemination of guidelines and manuals for applying the new techniques	All countries have or are in the process of testing BRD suitable for local conditions. An FAO BRD guide/manual (*Eayrs, S. A Guide to Bycatch Reduction in Tropical Shrimp-Trawl Fisheries. Rome, FAO. 2005)* has been published by the project and widely distributed (initial English version needs to be reprinted) (see also Outcome 4 below). • *Suitable BRD designs for their shrimp trawler fleets identified in all participating countries.*
3. Enactment of relevant legislation and development of an improved management framework	Adopted and published regulations and laws	Adoption of regulations by the fishing industry	Participating countries are currently at different stages of the process of developing and introducing BRDs. The need, process and priority given at the higher political level for changing relevant regulations also vary from one country to another. In some countries, the process may be initialised during the project period but there will not be enough time for formal adoption of the new/revised regulations. Some regional initiatives have been taken to look into the possibilities to harmonise legislation in neighbouring countries (Nigeria/Gulf of Guinea). • *The need and scope for legislative changes for formalising the use of BRDs identified in all participating countries.* • *Relevant new and/or revised legislation enacted in at least half of the participating countries.*

Project Document Logframe (cont.)			Comments on Project Performance and Indicators *(new proposed end-of-project targets in italics)*
Outcomes	**Objectively Verifiable Indicators**	**Means of Verification (Monitoring focus)**	
4. Enhance awareness of the problem of shrimp by-catch	Increased demand for materials and publications on shrimp fisheries and by-catch Number of hits on web site to be maintained by FAO	Monitoring of number of documentation requests and replies; statistics on web-site visitors	In most countries, the project has been working closely with the industry on sea trials and demonstration and the awareness of BRDs has been raised. Concerned government staff have also increased their knowledge on BRDs considerably. In some countries, studies are being implemented to increase the understanding of the socio-economic importance of by-catches. The project has a website that is managed by FAO. Project progress reports, meeting minutes, news briefs and other information are posted on the site. However, there are certain delays in the inclusion of new material and the web site is not overly user friendly. An FAO BRD guide/manual has been published and widely distributed (initial English version needs to be reprinted) (also mentioned under Outcome 2 above). SEAFDEC has produced promotional and information material for the project. • *At least half of the shrimp trawl owners and operators in the project areas know and can explain the basics regarding the usefulness and how to operate BRDs.* • *Improved understanding of the socio-economic importance of by-catches, in particular as a source of income for poorer population groups.* • *FAO by-catch/guide published in Arabic, English, French and Spanish) and distributed to all relevant stakeholders.*
5. Increase dialogue, interaction and joint operations at the country and regional levels	Specific technical assistance provided by resource countries Number of joint activities implemented among participating countries	Monitoring and reporting of active participation and interactions among countries and resource countries	Intra-regional technical cooperation has been extensive and useful, and inter-regional exchanges are also appreciated. However, considering the need to adopt technologies and regulations for the local context, an important part of the work need to done at the national level. At the same time, regional harmonisation is important in areas where fishery resources and marine habitats are shared. • *Discussions initialised and preliminary agreements to harmonise regulations on BRDs reached in at least two of the participating regions.* • *At least ten non-project countries have participated in project meetings and formally expressed interest in developing BRDs through regional cooperation.*

Project Document Logframe (cont.)			Comments on Project Performance and Indicators *(new proposed end-of-project targets in italics)*
Results	**Objectively Verifiable Indicators**	**Means of Verification (Monitoring focus)**	
1. Adoption of by-catch reduction devices by national and regional shrimp-trawling fisheries	Installation of devices in the shrimp-trawling gear	Reports of observers on use of by-catch reduction devices and on results of using them	See comments above, e.g. under Objective 1 and Outcome 2). • *At least 25% of the shrimp trawlers in at least half of the participating countries use BRDs.* • *By-catches reduced by 40% on trawlers using the devices.*
2. Improved management of shrimp-trawling fishery	Introduction of new management systems	Catch statistics by vessels and/or observer records	The focus of the project is on the development of BRDs and the reduction of by-catches although the project document does also mention management in a broader sense. Several participating countries are addressing different management issues in parallel with project activities (e.g. effort controls through closed seasons/areas and limits on number of trawlers) and most counterparts appear aware of the need to look at the introduction of BRDs as an integral part of fisheries management. An important step for governments in the process of introducing improved management is to establish partnerships with the industry and other stakeholders and this collaboration has been established and formalised in most participating countries. • *The need for and potential main components of improved management of shrimp fisheries identified, documented and discussed with the industry in at least two thirds of the participating countries.*
3. Increased co-operation among countries in research on and management of the resources	Number of agreements between governments on fishery research (especially relevant to the problems addressed by the project)	Joint scientific publications; reports of relevant scientific meetings and conferences	See comments above, e.g. under Outcomes 5. • *At least one paper FAO Fisheries Technical Paper (or similar) including experience from at least five of the participating countries published.* • *At least three scientific articles prepared jointly by researchers from at least three participating countries each published in accredited journals and/or presented at international conferences.*
4. Better understanding of the interactions between fishing gear and environment	Number of new research programmes on environmental issues	Scientific reports and publications	See comments above, e.g. under Objective 3. • *Research priorities identified and included in workplans and budgets of relevant research institutes in at least five participating countries.*

ANNEX 7: PROJECT PROMOTIONAL AND INFORMATION MATERIAL PRODUCED BY SEAFDEC

The following material has been produced by SEAFDEC within the framework of BRD promotion and the REBYC-project:

Research papers

Distributed to: SEAFDEC network libraries; research institutes and fishing gear technologists/researchers; and participants in relevant meetings and event.

No	Title	No. of Copies
1	Study on Juvenile and Trash Excluder Device (JTEDs) in Philippines	1,000
2	Study on Juvenile and Trash Excluder Device (JTEDs) in Indonesia	1,000
3	Study on Juvenile and Trash Excluder Device (JTEDs) in Thailand (cost share)	1,000
4	Study on Juvenile and Trash Excluder Device (JTEDs) in Malaysia (cost share)	1,000
5	Study on Juvenile and Trash Excluder Device (JTEDs) in Brunei (cost share)	1,000
6	The Study on 2nd Juvenile and Trash Excluder Device (JTEDs) in Brunei (cost share)	1,000
7	Study on Juvenile and Trash Excluder Device (JTEDs) in Vietnam (cost share)	1,000

Printed material

Distributed to: visitors and audience (including children) of SEAFDEC Training Department exhibitions; participants in on-site demonstrations; researchers; and participants in relevant meetings and event.

No	Title	No. of Copies
1	Brochure of Turtle Excluder Devices (TEDs) (Eng, Thai, and Jap)	2,000 of each language
2	Brochure of Juvenile and Trash Excluder Devices (JTEDs) (Eng, Thai, and Jap)	2,000 of each language
3	Manual of Construction and installation of Thai Turtle Free Device (TTFD)	1,000
4	Manual of Construction and installation of The Semi-curve rigid sorting grid JTED	1,000
5	Poster of TTFD	3,000
6	Poster of 4 types of JTEDs	2,000
7	Drawing book of Story of Tanu (Eng and Thai)	2,000 of each language
8	Cartoon book of Story of Tanu (Eng and Thai)	2,000 of each language

Documentary VCDs

Distributed to: participants of national and international conferences, meetings and workshops; participants of training courses on demonstration and experiment of TEDs and JTEDs in Southeast Asian countries; educational institutes, school, collages and university; and interested people during SEAFDEC exhibitions.

No	Title	Narration	Time	No. Of copies
1	Regional Practical Workshop on Selective Fishing Devices	BGM	10.30 Min	200
2	Demonstration and training on TEDs and JTEDs in the Arafusa sea, Indonesia	BGM	10.00 Min	200
3	Thai Turtle Free Device	Thai	12.10 Min	200
4	JTEDs in the Philippines	BGM	09.30 Min	250

5	The training course in the use of TEDs and JTEDs	BGM	08.30 Min	200
6	JTEDs in Southeast Asia (6 Countries)	BGM	10.00 Min	300
7	Demonstration and Training on By-catch Reduction devices (Indonesia)	BGM	06.20 Min	200
8	JTEDs in SAN MIGUEL Bay	BGM	13.00 Min	400
9	Demonstration and training on By-catch Reduction Devices SIBOLGA-NORTH SUMATERA	BGM	10.30 Min	200
10	Practical Training/Demonstration and Experiments on the Juvenile and Trash Excluder Devices (Calbayog City, Samar)	BGM	17.30 Min	200
11	Trainors Training/Workshop and Demonstration on Juvenile and Trash Excluder Devices THE AQUARIAM BEACH RESORT, Brgy Bani, La Union, the Philippines	BGM	18.00 Min	200
12	The Implementation of By-Catch Reduction Devices TEDs & JTEDs in Republic of Indonesia	Eng	10.50 Min	200
13	JTEDs in Indonesia (Summary)	BGM & Sound Track	08.30 Min	250
14	Juvenile and Trash fish Excluder Device Experiments and Demonstrations in Southeast Asia (8 Countries)	BGM & Sound Track	11.00 Min	350
15	JTEDs in the Philippines (Summary)	BGM & Sound Track	09.00 Min	250
16	Seminar - Orientation and Demonstration on the JTED Pilot Project Calbayog City , Samar , The Philippines	BGM & Sound Track	15.00 Min	200
17	TEDs Television Program	Spanish	45.00 Min	80
18	The use of Turtle Excluder Devices in Thailand	Spanish	12.00 Min	80
19	Training on the use of Turtle Excluder Device (Songkhla, Thailand)	Spanish	06.00 Min	80
20	Demonstration and training on TEDs and JTEDs in the Arafusa sea, Indonesia	Spanish	10.00 Min	80
21	JTEDs in the Philippines	Spanish	09.30 Min	80
22	JTEDs in Brunei	Spanish	12.00 Min	80
23	JTEDs in Vietnam	Spanish	08.15 Min	80
24	JTEDs in Malaysia	Spanish	05.30 Min	80
25	JTEDs (Sea Trial) in Rayong	Spanish	05.45 Min	80
26	The training course in the use of TEDs and JTEDs	Spanish	08.30 Min	80
27	JTEDs in Southeast Asia (6 Countries)	Spanish	10.00 Min	80
28	TEDs and JTEDs in Myanmar	Spanish	13.20 Min	80
29	Demonstration and Training on By-catch Reduction devices	Spanish	06.20 Min	80
30	The Regional Practical Workshop on Selective Fishing Devices	Spanish	10.30 Min	80

NB: BGM = Background music (It means that VCD showing with original sound and background music)

Souvenirs

Distributed to: participants in meetings and events; audience of SEAFDEC Training Department exhibitions; participants in on-site demonstrations;

No	Title	No. of Product
1	Turtle Conservation Magnetic	500
2	Turtle Conservation Key Chain	1,750
3	Fish Conservation Key chain	1,750
4	Sticker of TTFD	2,000
5	Sticker of JTED	2,000
6	Sticker campaign Small fish conservation	2,000
7	Polo-shirts on JTEDs	100
8	Polo-shirts on REBYC (FAO/GEF Project)	100
9	T-shirts for TEDs	200
10	T-shirt for JTEDs	200
11	T-shirt for REBYC (FAO/GEF project)	200
12	Cap for JTEDs	100
13	Cap for TEDs	100
14	T-shirt for Sea turtle Save!	100

ANNEX 8: PROJECT CO-FINANCING AND LEVERAGED RESOURCES

(USD, rounded to nearest 1,000)

Co-financing	GEF financing		Implementing / executing agencies		Governments *)		Private sector **)		TOTAL		Total disburse-ment
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
- Grants	4,780,000	4,780,000							4,780,000	4,780,000	2,067,000
- In-kind support											
Governments					1,445,000	663,000			1,445,000	663,000	663,000
Private sector							1,805,000	234,000	1,805,000	234,000	234,000
FAO			1,010,000	925,000					1,010,000	925,000	585,000
UNEP ***)			110,000	110,000					110,000	110,000	110,000
- Cash support											
Governments					0	1,425,000			0	1,425,000	1,425,000
Private sector							0	223,000	0	223,000	223,000
FAO				340,000					0	340,000	225,000
UNEP ***)											
TOTALS	4,780,000	4,780,000	1,120,000	1,375,000	1,445,000	2,088,000	1,805,000	457,000	9,150,000	8,700,000	5,532,000

*) Data from Bahrain, Cameroon and Iran are missing completely. For Nigeria, only partial information.
Contributions by SEAFDEC of USD 193,000 included.

**) Contributions from the private industry are likely to be underestimated because of insufficient recording of vessel and crew time during sea trials.
Time spent in training/workshops/meetings by private sector representatives is usually not recorded at all.

***) UNEP contributions according to pledges in project document.