

PROJECT BRIEF

1. IDENTIFIERS

PROJECT NUMBER:	<i>[Implementing Agency Project Number not yet assigned]</i>
PROJECT TITLE:	Global (Nigeria, Cameroon, Iran, Venezuela, Costa Rica, Cuba, Trinidad and Tobago, Colombia, Mexico, Indonesia and Philippines): Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of By-catch Reduction Technologies and Change of Management
GEF IMPLEMENTING AGENCY:	United Nations Environment Programme (UNEP)
EXECUTING AGENCIES:	Food and Agriculture Organization of the United Nations (FAO)
REQUESTING COUNTRIES:	Nigeria, Cameroon, Iran, Venezuela, Costa Rica, Cuba, Trinidad and Tobago, Colombia, Mexico, Indonesia and Philippines ¹ .
ELIGIBILITY:	The countries are eligible under paragraph 9(b) of the GEF Instrument.
GEF FOCAL AREAS:	International Waters with relevance to Biological Diversity
GEF PROGRAMMING FRAMEWORK:	Operational Program # 10 Contaminant-based Operational Program – Regional/Global Technical Support Component.

2. SUMMARY

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, while 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.

¹ In addition Bahrain will participate in project activities although, since it is not GEF-eligible, financial support will be provided from other sources.

3. COSTS AND FINANCING (MILLION US \$)

GEF:	
Project:	US\$ 4.450
PDF:	US\$ 0.330
Subtotal GEF:	US\$ 4.780
Co-financing:	
UNEP	
PDF in cash & kind:	US\$0.0400
Full Project (in kind):	US\$0.1000
FAO	
PDF in cash & kind:	US\$0.1000
Full Project in cash:	US\$0.8500
Full project in kind:	US\$0.1000
Governments in cash & kind:	
PDF:	US\$0.0500
Full Project:	US\$ 1.395
National Fishing Industry (total countries combined)	
Full Project:	US\$ 1.805
Subtotal Co-financing:	US\$ 4.440
Total Project Cost:	US\$ 9.220

4. ASSOCIATED FINANCING (MILLION US \$)

Efforts to address the environmental problems associated with tropical shrimp trawling have increased in the last decade. Several countries have designed and developed specific programmes to minimize by-catch associated with shrimp fisheries; for example, Australia, Cuba, France, India, Indonesia, Iran, Mexico, Mozambique, Norway, Philippines, Tanzania, Thailand, Venezuela, and the USA. Investments have been made in development of technology and testing of by-catch reduction devices, in training of human resources, and in promotion of dialogue and consultations with the fishing industry. The overall costs associated with these efforts worldwide are estimated to be in billions of dollars.

5. OPERATIONAL FOCAL POINT ENDORSEMENT(S)

Cameroon: Mr. J.S. Amougou, Direction de la Faune et des Aires Protégées, Ministère de l'Environnement et des Forests, Yaoundé, Cameroon: Date of receipt 7th September 2000

Colombia: Ms. C. Hoyos, Oficina de Cooperación Internacional, Ministerio del Medio Ambiente, Santa Fé de Bogotá, Colombia: Date of receipt 7th September 2000

Costa Rica: Guaria Vargas A, Delegada Ejecutiva, FUNDECOOPERATION, Date of receipt 25th September 2000

Cuba: H. Arango Sales, Director for International Collaboration, Ministry of Science, Technology and Environment, Havana, Cuba: Date of receipt 1st September 2000

Indonesia Mr. E. Sumardja, Deputy for Law Enforcement and EIA, Environmental Impact Management Agency (BAPEDAL) Jakarta, Indonesia. Date of receipt 12th September 2000

Islamic Republic of Iran: Mr. P. Hosseini, Director-General for International Affairs, Ministry of Foreign Affairs, Tehran, Islamic Republic of Iran. Date of receipt 10th September 2000

Mexico: Mr. R. Ochoa, Director, International Financial Institutions, Ministry of Finance of Mexico, Mexico. Date of receipt 14th September 2000

Nigeria: Ms. A. Ene-Ita, Office of the Director General/Chief Executive, Federal Environmental Protection Agency, The Presidency, Abuja, Nigeria. Date of receipt 7th September 2000

Philippines: Mr. M.S. Roño, Undersecretary for International Commitment & Local Government Affairs, Dept. of Environment and Natural Resources, Quezon City, 1100, Philippines. Date of receipt 5th September 2000

Trinidad and Tobago: Dr David McIntosh, Managing Director/Executive Director, Environmental Management Authority, Port of Spain, Trinidad and Tobago. Date of receipt 7th September 2000

Venezuela: Mr L. Nino, First Secretary, Embassy of Venezuela, Washington, D.C. N. Pino, Ambassador, International Economic Cooperation, Caracas, Venezuela. Date of receipt 5th June 2000

6. IA CONTACT:

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LIST OF ACRONYMS

BRD	By-catch reduction device
CECAF	Fishery Committee for the Eastern Central Atlantic
TED	Turtle exclusion device
FAO	Food and Agriculture Organization of the United Nations
NGO	Non-Governmental Organization
RECOFI	Regional Commission for Fisheries
ROPME	Regional Organization for the Protection of the Marine Environment
SEAFDEC	Southeast Asian Fisheries Development Center
UNEP	United Nations Environment Programme
WECAFC	Western Central Atlantic Fisheries Commission

I. BACKGROUND AND CONTENT

1. Operational Programme No. 10 “Contaminant-based Operational program”, states that *"targeted regional or global projects useful in setting priorities for possible GEF interventions, meeting the technical needs of projects in this focal area, or distilling lessons learned from experience"* (para 10.2)." Further, this OP lists as a short-term objective *"develop.....aimed at deriving and disseminating lessons learned, sharing the learning experience with groups of countries co-operating on international waters projects, and addressing the technical and institutional needs of those countries co-operating on International Waters projects."* [para 10.4, sub-para (d)].

2. One such source of stress that is of growing international concern is capture fisheries and the need to develop, promote and implement environmentally sound technology and practices in the marine fisheries sector so as to prevent loss of biodiversity and habitat degradation. Data suggest that ecological impacts and mortality rates resulting from by-catches in world fisheries are significant, affecting finfish (particularly juveniles of commercial species), benthic invertebrates, marine mammals, turtles and birds. The Food and Agriculture Organization of the United Nations (FAO) estimated recently that, world-wide, discards in commercial fisheries are around 20 million metric tons and account for economic losses that run into billions of dollars annually. Tropical shrimp-trawler fisheries generate more by-catch than any other type of fishery. Although several devices have been developed and have proved to be efficient in the reduction of by-catches, to date, no concerted international effort, involving all key parties, has been made to resolve the problem of the impact of tropical shrimp-trawler fisheries on marine ecosystems and species.

3. The project addresses two important policy issues: food security and biological impact of trawling on the environment. Demand for marine food for the increasing human population is likely to increase substantially in the immediate and foreseeable future. At the same time, international pressure to reduce the adverse environmental impacts of human exploitation of natural production is likely to increase. These two pressures may be seen as conflicting, hence the need to achieve optimum production potential while reducing adverse environmental impacts. Present shrimp-trawling practices are currently unsustainable and pressure on the fisheries sector to change current practices and reduce the impact of shrimp trawling in tropical shallow-water ecosystems is increasing.

4. Shrimp trawling in tropical regions is very common. The cod-ends of the trawls have relatively small meshes to retain the all-important shrimp catch. Such fisheries are often carried out in shallow waters which, in many cases, are spawning and nursery grounds for juvenile fish of potentially high commercial value. The consequence of this trawling is therefore that large amounts of juvenile fish are caught together with the targeted shrimps. Some of these fish, as well as other low-valued by-catch, are often discarded at sea. In some tropical areas, turtles are also relatively abundant on the shrimp fishing grounds and are incidentally captured and drown in shrimp trawls. Trawling is also a fishing method that results in physical impact on the bottom habitat, and in some areas this impact might have a detrimental effect on benthic biodiversity.

5. Some countries have taken action to mitigate the problem of turtle by-catch, and the use of the turtle-exclusion device (TED) is compulsory in tropical shrimp fisheries in the USA and in countries having problems with turtle by-catch which export shrimp to the USA. Australia has also

introduced TEDs in some of their shrimp fisheries. The problem of fish by-catch, particularly of juvenile food fish, has more recently been identified as a priority area for mitigation. Research aimed at developing efficient and practical solutions is ongoing in several countries, including the USA, Australia, Mexico and Thailand. This development is likely to continue in these countries, but because it requires substantial financial and human resources it will, without GEF intervention, be restricted to countries with a strong economy.

6. During its Fifty-third Session, the General Assembly of the United Nations *urged* "States, relevant international organizations and regional and sub-regional fisheries management organizations and arrangements to take action, including through assistance to developing countries, to reduce by-catches, fish discards and post-harvest losses consistent with international law and relevant international instruments, including the Code of Conduct for Responsible Fisheries" (Resolution A/RES/53/33).

7. Reducing by-catch and discard of unwanted catch is presently the policy of many States and for an increasing number of regional and sub-regional fisheries management organisations and arrangements. The reduction of discards and environmental impact is also a priority activity of FAO's Regular Programme. This issue is addressed specifically in a FAO 6-year project entitled "*Reduction of discards and environmental impact from fisheries*" with an annual budget of approximately US\$ 500,000, which includes evaluation of by-catch and discards resulting from various fisheries, and assessment of the impact of trawling and other methods on the bottom, and on the environment in general.

8. This project proposal has been developed through a process where government-appointed National Co-ordinators from 13 countries agreed with the executing agency, FAO, on a common approach to national baseline studies. Baseline studies were executed under the supervision of the National Co-ordinator and involved a wide consultative process with most stakeholders having an interest in shrimp exploitation. Most countries established a national committee and national workshops attended by many industry representatives and in some cases by environmental NGOs were arranged for the purpose of reviewing the national problems of by-catch in shrimp trawls. In addition workshops were held in each of the four regions (Latin America and Caribbean, Asia, Middle East and Africa) to discuss the findings in the national reports and to agree on national and regional priorities to be included in a main-phase project. Representatives from countries other than the core 13 and relevant stakeholders from industry and society were also invited to attend these workshops. The proposed national and regional arrangements and modalities in the present proposal, including selection of countries, resulted from these regional workshops.

9. The 7 full participating countries proposed are Nigeria, Iran, Venezuela, Costa Rica, Mexico, Indonesia and Philippines and they were selected based on their indication during the preparatory phase of the project that they have a severe problem with fish by-catch in their shrimp fisheries and the wish they expressed to participate in a global effort. These selected countries have also some form of management infrastructure in place, which makes them well suited to execute a project of this size and complexity. The shrimp fishery in these countries is also of significance for the region they belong to, and the positive impact on the environment resulting from interventions forecasted will thus be greater than executing the project in a country with a smaller shrimp fishery. A number of other countries will participate in joint activities with one of the main partners: Cameroon, Bahrain, Colombia, Cuba and Trinidad and Tobago. These countries were

very active and participated in the preparatory phase. They have also important shrimp fisheries, but the catches are generally smaller than for the main participating countries. Mexico will participate, although it was not formally a participating country in the preparatory phase. It is the country with the most important shrimp fishery in Latin America, and is also the country with most advanced experience in by-catch reduction devices in the region, besides the USA. A brief description of the shrimp fishery in each of the participating countries, reflecting the baseline survey carried out within the preparatory phase of the project, is provided in Annex E.

II. RATIONALE AND OBJECTIVES

10. This project will address the problem of discarding unwanted catch and by-catch of juvenile food fish in particular through the introduction of appropriate fishing technologies and practices in combination, where appropriate, with introduction of legislation and a management framework including control and enforcement strategies. It will also aim at introducing solutions that avoid capture of turtles where such by-catch exists. The impact of trawling on bottom habitat will also be addressed in a small number of countries, initially to gain a better understanding of such impacts, as such knowledge is very poor at present.

11. The overall objective of the project is to reduce discard of fish captured by shrimp trawlers, primarily by introducing technologies that reduce the catch of juvenile food fish in a selected number of developing countries. The participating countries have themselves identified the capture of juvenile food fish and discard as a non-sustainable practice and have therefore assigned priority to reducing the problem nationally. The countries will therefore contribute through management and research in the biology and fishing-gear fields.

12. The project is designed to carry out a demonstration activity in at least one developing country in each GEF development region. The benefit of this strategy is that a consolidated effort undertaken in a few countries will generate lessons that can be rapidly transferred to other shrimp fishing countries in the same region. Active participation in the implementation of selected activities by countries not executing full project activities will facilitate this process.

III. PROJECT ACTIVITIES/COMPONENTS AND EXPECTED RESULTS

13. Project activities will be undertaken at global, regional and participating-country levels. Activities at the global level include the collection and wide dissemination of data on tropical shrimp fisheries and their impact on the environment in general. Dissemination of useful information to improve the exploitation of shrimp resources globally will be given high priority. FAO will be the executing agency for the project and thus responsible for its operation and management and for co-ordination of activities at the regional and global levels.

14. In each of the participating countries the impact on the environment of present production systems will be assessed and used as a basis for an evaluation of the impact of new fishing practices, which will be introduced through the project. The major activities in the participating countries will be to develop and/or adapt by-catch reduction technologies which reduce the capture of juvenile fish, non-target fish and non-fish species, to an acceptable level. Successful

developments will require training and extension as well as development of a legal framework and mechanisms for monitoring, control and enforcement of any new regulations that may be adopted.

15. The ultimate output of the project will be the adoption by several of the participating countries of fishing technologies and practices that are environmentally friendly so that their shrimp trawling fisheries will be enhanced in terms of their environmental performance and reduction of biological impacts and be regarded as more sustainable in the future. A direct outcome of the project will be the reduction in number of juveniles caught by trawlers using BRDs compared to trawlers not using such devices. This can be verified when a successful BRD has been developed and introduced in a shrimp fishery and a comparison made with a trawl equipped with BRD and one without. Another indicator of project success will be the number of trawlers using BRDs in each fishery at the end of the project period. An additional product expected is the improvement in national capacities for the sound management of the shrimp-trawler fisheries and increased co-operation required among countries at the regional and global levels. All of which would not be achievable without the framework provided by this project.

16. **Component A: Global and Regional co-ordination and networking.** Under this component, activities will result in production of global information concerning shrimp fisheries, including production of guidelines and information material and facilitation of suitable technical advisory services to facilitate transfer to more environmentally sound trawling practices. Such information material will include: an electronic publication on shrimp fishing methods; inventory of by-catch reduction devices (BRDs); annual report by countries about the shrimp fisheries (effort, catches and any by-catch problems); inventory of legal and policy frameworks for sustainable shrimp fisheries; guidelines and information material on sustainable shrimp fishing technologies; and a directory of experts and institutions experienced in this field.

17. **Component B: National Level Actions to introduce more sustainable practices.** This component encompasses national level activities to introduce by-catch reduction technologies in 6 countries (Nigeria, Iran, Venezuela, Costa Rica, Indonesia and Philippines) aimed at a reduction of by-catch by 50% by the end of the project period.

18. **Component C: Regional activities to expand participation and wider adoption of more sustainable practices.** Joint Participation in exploratory fishing with one of the full participating countries by Cameroon, Cuba, Trinidad and Tobago, Colombia and Mexico. GEF support will be provided to these countries to participate in assessment activities led by one of the full participating countries. The activities of the project will be co-ordinated with other on-going related or complementing regional or sub-regional programs: in particular, WECAFC in the Caribbean; CECAF, in the Gulf of Guinea; RECOFI, ROPME/UNEP Project, in the Gulf; SEAFDEC project in Southeast Asian countries. Under this component execution of project activities in SEAFDEC Asian member countries will involve development and introduction of juvenile fish excluders.

19. **Component D: Project Operations and Management.** FAO expertise from various disciplines, including fishing gear experts, biologists, policy experts, economists, legal experts and communication experts will be involved in providing support to the project execution.. An internal task force will be established within FAO to provide oversight and substantive inputs to the project

during execution, as well as to monitor and evaluate the project implementation. FAO will ensure proper execution and co-ordination of activities within the project with the identification of responsible staff, including a full time Project Co-ordinator. FAO will also support the execution of activities at country, regional and global levels through support to the national steering committees, to the national co-ordinators and to the organisation of meetings at regional and global levels.

20. The activities required to achieve project outputs are detailed in Annex F. The detailed activities at national level will differ somewhat between countries, as the situation with regard to fishing fleet, trawl gear and fishing conditions are different in the various countries. A common approach will be to evaluate possible options for the introduction of BRDs, in consultation with the industry, conduct experiments on commercial trawlers, evaluate the results, undertake mid-term assessment of the benefit of BRDs through a voluntary exploratory fishing period and, finally, introduce BRDs on a larger scale. This latter activity will require extensive information campaigns and involve expertise in developing the necessary legal and management frameworks in each participating country to adopt and implement the use of such devices as standard practice. In addition to activities aimed at introducing technologies that can solve the by-catch problem, some countries are considering the introduction of alternative fishing methods; others are considering management measures such as closed seasons and closure of fishing grounds for trawling, as possible options to achieve the objective of reduced by-catch. These options will be explored during the project and measures adopted, as appropriate, by individual countries.

IV. RISK AND SUSTAINABILITY

21. A change to more environmentally sound shrimp trawling might in the short term generate some economic losses to the shrimp-trawling industry, as the efficiency for the target catch might be slightly reduced and there will be reduced income from by-catch, with immediate social consequences in a few countries. Without adoption of such practices however, shrimp trawling might, under strong international pressure, become severely restricted because of its negative environmental impact, resulting in market loss and enforced restriction of activities. With adoption of such practices the international acceptability of capture fisheries may increase, thus permitting continuation of the industry and thereby ensuring an important source of export income for many developing countries. Successful adoption of such practices should result in the added benefit of an increase in production of food fish through reduction of juvenile-fish mortality in the shrimp-trawling industry and associated gains in the quality of the products and working conditions (e.g. reduction of sorting time) .

22. The major risk is that the developed technology will not be accepted by the fishing industry, which might occur if the shrimp catch is substantially reduced and if there is a major loss of income from by-catch. The involvement of the industry in all stages of the project implementation is therefore crucial and all stakeholders will be involved in and kept fully abreast of progress.

V. STAKEHOLDER PARTICIPATION AND IMPLEMENTATION

23. A range of stakeholders representing different groups, such as fishers (shrimp fishers, coastal fishers and other fishers), researchers (gear technologists, biologists, environmentalists), fishery managers, coastal-zone managers, fish traders, fish processors and various NGOs have

some interest in the issues addressed by this project. Continuing the practices and the network of key persons and contacts developed during the preparatory phase, all stakeholders will be involved in project design and execution through the establishment of and participation in national steering committees.

24. The project will be implemented at three levels: global, at which FAO collects, quality controls, collates, analyses and disseminates information that will be useful in reducing the environmental stress of shrimp trawling; national, in countries that have a problem with their present shrimp exploitation and have committed themselves to changing their fishery by introducing more environmentally sound fishing technologies and practices; and regional, for co-ordination between countries within a region, and to facilitate dissemination of successful results from the project to neighbouring countries.

25. The arrangements in the various countries will, to a large extent, depend on their capacity and tradition for stakeholder participation in such processes. Realising, however, that any change of fishing practice can hardly be efficient without the fishers' participation and commitments, any arrangement set up in a country should take this into account. One recommended model, based on experience gained during the preparatory phase, is to have a National Steering Committee and a National Co-ordinator to decide on important issues regarding the project implementation. The membership of the Steering Committee should include representatives of the fishery managers, researchers, fishers (shrimp fishers and non-shrimp fishers) and NGOs, as appropriate.

26. Introduction of new technologies will affect the fishers, and as they are often the people with the best knowledge of any by-catch problems, their co-operation in finding acceptable solutions will be given high priority from the outset of the project. The project activities will include testing of technologies already proven efficient in shrimp fisheries elsewhere; the adaptation to local conditions will often be a major challenge. Fishers have experience of their local situation, which is most valuable in this respect. The introduction of new technologies goes through a process by which, preferably, technologies to be tested in a particular shrimp fishery are decided in consultation with the industry, and fishers play a key role in the exploratory fishing, using commercial vessels for such tests. Following a successful outcome of experimental fishing, several fishers should be given the opportunity to test the new gear on a voluntary basis, the incentive being that the new gear is provided free of charge and, in some instances, fishers might be given access to areas that are usually closed to traditional shrimp trawling.

27. Based on the results from the large voluntary experimental fishing, the managers, in consultation with the researchers and fishers, should decide on which management requirements, including a legal framework, might be necessary to institutionalise more environmentally friendly shrimp fishing.

28. Generally, the capacity in fishing-gear technology, fishery management and to a lesser extent in marine biology, including shrimp biology, is poor in most of the countries involved in this project. However, some developing countries have gained skills in the development and use of by-catch reduction devices, particularly Mexico in the Caribbean/Latin American region, whereas SEAFDEC has played and still plays an active role in the introduction of by-catch reduction devices in their Asian member countries. Outside the tropical regions, some developed countries, particularly the USA, Australia, Norway and France, have developed skills to find practical

solutions, including by-catch reduction technologies, in their shrimp fisheries. A mechanism whereby the experience of these more advanced resource countries is tapped to provide technical assistance, and the sharing of lessons learned with the countries within the project, will be an important part of its implementation.

29. One possible option, which will be explored, is for such assistance to be formalised between the recipient country and resource country, through a co-operation agreement with a relevant institution. An alternative option is that experts from “advanced countries” are contracted to provide in-country assistance in a country requiring a particular expertise. The role of FAO in this process will be to arrange the formal contracts or facilitate the conclusion of co-operation agreements. In this context, directories of experts and institutions dealing with the subject matter of the project will be set up and maintained by FAO for the duration of the project.

VI. INCREMENTAL COSTS AND PROJECT FINANCING

INCREMENTAL COSTS

30. An outline of the incremental and baseline costs of this project are contained in Annex A and summarised in Table 1 below. The participating countries and the FAO, as the organization responsible for facilitating implementation of the Code of Conduct for Responsible Fisheries, are committed to action to reduce the volume of discarded by-catch from shrimp-trawl fisheries. The FAO contribution outlined in Table 2 is presented here as part of the baseline. In reality however, such co-financing is itself incremental, since it results in supranational environmental benefits.

31. FAO-funded components involve, *inter alia*, facilitating the transfer of technology and information to shrimp-trawl fisheries in the participating countries and thus addressing a primary barrier to adoption of more-sustainable practices, namely, insufficient access to information on such practices.

32. In reality, adoption of by-catch reduction devices is likely to result in short-term economic losses to the trawl industry and to the governments in terms of lost foreign-exchange earnings, resulting from a reduced shrimp catch and less by-catch in countries where markets now exist for it. In contrast, the medium-term economic benefits resulting from the exclusion of juveniles of commercially important finfish species from the by-catch may result in improved recruitment to commercial finfish fisheries and hence enhanced economic benefit at the national level. However, such benefits will accrue to sectors of the fishing industry other than the shrimp trawlers, and quantifying such economic benefits will only be possible following the experimental fishing which forms a component of this project. In the longer term it is possible that international markets for wild-caught shrimp by fisheries that operate without by-catch reduction devices will decline due to increasing international concern about the impacts of trawl fisheries. Therefore, markets may decline, thus providing an unquantifiable incentive for the adoption of such techniques. Such longer-term economic benefits are difficult to estimate at the present time.

Table 1. Incremental costs

	Baseline	Alternate	Increment
Global Information Production and Dissemination	0.85	0.85	0.00

National-Level Actions			
B.1 Nigeria	0.30	0.80	0.50
B.2 Iran	0.30	0.80	0.50
B.3 Venezuela	0.55	0.95	0.40
C.4 Mexico	0.85	1.55	0.70
B.5 Costa Rica	0.20	0.50	0.30
B.6 Indonesia	0.30	0.70	0.40
B.7 Philippines	0.20	0.60	0.40
Regional Activities to Expand Participation			
C.1 Trinidad and Tobago	0.10	0.20	0.10
C.2 Cameroon	0.05	0.10	0.05
C.3 Colombia	0.10	0.20	0.10
C.4 Cuba	0.05	0.20	0.15
C.5 Bahrain	0.50	0.50	0.00
C.6 SEAFDEC	0.15	0.25	0.10
Project Co-ordination and Management	0.20	0.95	0.75
Total	4.250	8.700	4.450

FINANCING

30. Activities under component A (see section III, above) will be funded by FAO regular programme funds; activities in components B and C will be funded through in-kind contributions and co-financing from participating countries and from GEF funds. As indicated in Table 2, component D, which is the cost of co-ordination and management of the project by the executing agency FAO, will be co-funded by GEF and FAO. Project duration will be 5 years from project final approval. A detailed list of activities and timeline is provided in Annex F, and Table 2 provides details of component financing.

Table 2. Component financing (million \$)

Component	GEF	Co-financing				Total
		UNEP ²	FAO	Gov'ts.	Priv. sector	
Global Information						
A.1 Publication of shrimp-fishing methods	-	-	0.10	-	-	0.10
A.2 Inventory of BRDs	-	-	0.20	-	-	0.20
A.3 Annual reporting	-	-	0.15	-	-	0.15
A.4 Inventory of legal and policy issues	-	-	0.15	-	-	0.15
A.5 Guidelines and information materials	-	-	0.20	-	-	0.20
A.6 Directories of experts and institutions.	-	-	0.05	-	-	0.05
National-Level Actions						
B.1 Nigeria	0.50	-	-	0.10	0.20	0.80
B.2 Iran	0.50	-	-	0.15	0.15	0.80
B.3 Venezuela	0.40	-	-	0.20	0.35	0.95
B.4 Mexico	0.70	-	-	0.25	0.60	1.55
B.5 Costa Rica	0.30	-	-	0.15	0.05	0.50
B.6 Indonesia	0.40	-	-	0.10	0.20	0.70
B.7 Philippines	0.40	-	-	0.10	0.10	0.60
Regional Activities to Expand Participation						
C.1 Trinidad and Tobago	0.10	-	-	0.05	0.05	0.20
C.2 Cameroon	0.05	-	-	0.025	0.025	0.10
C.3 Colombia	0.10	-	-	0.05	0.05	0.20
C.4 Cuba	0.15	-	-	0.05	-	0.20
C.5 Bahrain	-	-	³	0.02	0.03	0.05
C.6 SEAFDEC	0.10	-	-	0.15	-	0.25
Project Co-ordination and Management	0.75	0.10	0.10	-	-	0.95
Total	4.45	0.10	0.95	1.395	1.805	8.70

VII. MONITORING, EVALUATION AND DISSEMINATION

31. At the global level, a Project Co-ordinator selected and appointed by FAO in consultation with UNEP will ensure that the planned activities in each country are conducted according to plan. Other technical staff of FAO, including fisheries experts in the regional and sub-regional offices, will assist in the implementation of specific activities in the various countries, as appropriate. FAO staff will execute the global activities, and the Project Co-ordinator will co-ordinate the technical outputs. Within FAO a task force with expertise in the all relevant fields will be established to review progress and advise on strategies for project implementation. At the country level one institution will be assigned the lead responsibility for the implementation of the national activities. This institution will select and assign a National Co-ordinator, in consultation with FAO and UNEP, as appropriate, who will be paid part-time from GEF funds. At the national level a committee of all stakeholders will be established as a National Steering Committee with a mandate to review progress and advise on all aspects of the project implementation in the given country.

² In-kind

³ To be confirmed.

32. The activities in each country will be evaluated against milestones in terms of results, which will allow decisions to be taken regarding implementation of further activities. One important milestone will be the completion of experimental fishing using one or several by-catch reduction technologies. The execution and results of these experiments should be analysed by the National Steering Committee in consultation with FAO staff immediately afterwards. At that stage it is important that the experience from testing in different countries be compared and that good lessons learned be communicated to all other parties involved. A second major milestone will be met when the device(s) is(are) introduced into the shrimp fishery. An evaluation of the successes or failures of this introduction is not envisaged until the project has been running for at least three years. In some countries this evaluation might require additional time. The introduction phase should, however, be continuously monitored and evaluated, so that corrective measures can be taken. Here again, lessons learned in other countries will be important to achieve expected results.

33. Dissemination of results from any activity conducted in the course of the project is of interest to all participants as well as to a wider audience of countries struggling with the same by-catch problems. The information-dissemination aspects of the project will therefore be given high priority, and an internet web site managed by FAO will play an important role in this regard. The success stories will also be disseminated through appropriate reports and pamphlets. Because of the large public interest in the issue, it is also likely that TV stations will provide informative reports on the successes as they emerge.

34. Indicators of implementation at the global level will include publication and dissemination of documents and awareness materials mentioned above, and secondly, the demand for these. At the national level the number of vessels using the new technology will be a key measure of success. A more direct measure will be the change in the amount of by-catch taken with the new technology compared to the old.

LIST OF ANNEXES

ANNEX A - Incremental Cost Analysis

ANNEX B - Logical Framework Matrix

ANNEX C - STAP Roster Technical Review

ANNEX D - Available Reference Documents

ANNEX E - Overview of the Shrimp-Trawl Fishery in the Participating Countries

ANNEX F - List of Activities and Timetable

ANNEX A

INCREMENTAL COST ANALYSIS

FOCUS OF THE PROJECT

In essence this project is a barrier-removal intervention focussing on two types of barrier to the adoption of more-sustainable and less environmentally damaging technologies in the tropical shrimp-trawling industry.

The first of these barriers relates to the availability of information on BRDs in the countries and shrimp-trawling industries located in tropical developing countries. The second relates to economic factors, including the capital costs of adopting BRDs and the absence of strong economic incentives to adopt such technologies even when the information is available and when capital resources for investment are also available.

ECONOMIC AND ENVIRONMENTAL BENEFITS

Immediate or short-term national environmental and/or economic benefits to the adoption of BRDs are difficult to identify. Indeed it could be argued that short-term economic disbenefits will result from the adoption of such devices within the trawl industry. BRDs result in a lowered shrimp catch and fish by-catch in countries where markets now exist for fish by-catch, and hence lowered income and profitability to individual trawl owners and the fishing sector as a whole. At the national level, this results in loss of foreign exchange earnings. Regrettably, it is not possible at present to quantify such losses at either the national or sector levels, nor at the level of the individual trawl operator. There is some evidence to suggest that reduction in by-catch will improve the quality of the product and working conditions but the economic benefits from such changes cannot be estimated at this time.

In contrast, medium-term economic benefits may result from the adoption of such by-catch reduction devices. Such benefits could result from the exclusion of juveniles of commercially important finfish species from the shrimp-trawl catches, resulting in improved recruitment to commercial fin fisheries and hence enhanced economic benefit at the national level. However such benefits will accrue to sectors of the fishing industry other than the shrimp trawlers, and quantifying such economic benefits will only be possible following the experimental fishing which forms a component of this project.

In the longer term it is possible that international markets for wild-caught shrimp derived from fisheries that operate without by-catch reduction devices will decline due to increasing international concern regarding the impacts of trawl fisheries on non-target species. Therefore markets may decline in the longer term, thus providing an incentive for the adoption of such techniques. Again such longer-term economic benefits are difficult to estimate at the present time.

One immediate environmental benefit will be a reduction in accidental mortality of endangered turtle species, whilst an overall reduction in by-catch should result in enhanced recruitment to populations of non-commercial species, thus protecting biological diversity in tropical soft-bottom communities or taxa.

BASELINE AND INCREMENTAL ACTIONS

The participating countries are committed to implementing the FAO Code of Conduct for Responsible Fisheries and have, through the project preparatory phase, indicated strong willingness to examine methods for reduction of discarded by-catch, including the adoption of BRDs and improved management regimes for their tropical shrimp-trawler fisheries. Improvements in management, including the establishment of quotas, institution or extension of closed seasons and closure of specific fishing grounds, are likely to be undertaken in the absence of this intervention. This project will however greatly enhance the development and rate of adoption of such management regimes by facilitating the transfer and exchange of information between countries sharing individual trawl fisheries.

The FAO co-financing is presented in Table 2 as part of the project baseline, since such actions would continue to be undertaken by FAO in the absence of GEF financing. In reality however such co-financing is itself incremental since it results in supranational environmental benefits, including, *inter alia*, a more rapid transfer of information and knowledge than would occur in the absence of FAO. Actions such as those contained in component A of the project, which are concerned with information production and dissemination, could not occur through national action alone and would in fact result in little or no direct national benefit to a country supporting such activities. Nevertheless such actions are likely to contribute to more rapid adoption of sustainable techniques by overcoming the barriers to information access.

FAO-funded components involve, *inter alia*, facilitating the transfer of technology and the conduct of experimental fishing to provide direct information on the reduction of by-catch (environmental benefits) and on the magnitude of the reduction of the target species (economic costs). Such data are not currently available, so the economic arguments based on medium- and longer-term benefits cannot be quantified and presented to decision making bodies within the fisheries sector.

Access to such information and the consequent adoption of more-sustainable shrimp-trawling technologies may ultimately result in longer-term national environmental and economic benefits. In contrast the initial capital costs of adopting such technologies cannot be justified economically at the present time, since the economic benefits cannot be quantified, whereas the costs are immediate and apparent.

ANNEX B
LOGICAL FRAMEWORK MATRIX

Summary	Objectively Verifiable Indicators	Means of Verification (Monitoring focus)	Critical Assumptions and Risks
Overall Objectives			
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	Economic and social factors related to market opportunities for 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	Same as above
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	Same as above
Outcomes			
Minimising the pantropical problem of discarded 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	Temporary loss of income from by-catch trade in some countries
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 and fishing activities through observer and/or VMS managed by the Fisheries Administration Dissemination of guidelines and manuals for applying the new techniques	Lack of funds to change fishing practices that might lead to lower economic returns, even if only temporarily
Enactment of relevant legislation and development of an improved management framework	Adopted and published regulations and laws	Adoption of regulations by the fishing industry	That relevant laws and regulations will be complied with 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 and relevant regional	Monitoring of number of documentation requests and replies; statistics on web-site visitors by FAO	Web site will be attractive and well maintained, with up-to-date information on project activities and results

	fishery bodies		
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 through Fisheries Administration and regional fishery bodies	Interest of and contributions by resource countries and institutions would need to be forthcoming and materialised
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	In some countries the by-catch of marketable fish is an important source of income to coastal communities; reduction of by-catch rates could lower employment rates and reduce income. Efforts might be made to develop uses of unavoidable by-catch now being dumped at sea
Improved management of shrimp-trawling fishery	Introduction of new management systems	Catch statistics by vessels and/or observer records	Shortage of qualified staff
Increased co-operation among countries in research on and management of the resources	Number of agreements between governments on fishery research , joint activities between research institutions in the countries (especially relevant to the “ problems addressed by the project”)	Joint scientific publications; reports of relevant scientific meetings and conferences	Lack of funds and capacity for research
Better understanding of the interactions between fishing gear and environment	Research programmes on the development and introduction of gears with lower physical impact on the seabed (light weight gears, bobbins etc.)	Scientific reports and publications	Same as above
Components/Activities			
Inventory of by-catch reduction devices; legal and policy framework	Development and adoption of guidelines and information material for by-catch reduction devices	Adoption of legal framework; publications	None
Identification of problems of by-catch	Studies in 6 participating countries	Presentation of results; development of relevant research programmes	None
Mapping of distribution of catches of target species and by-catch; determination of catch composition in	Increased/improved data-collection programmes; increase in related research work; organization of	Research and workshop reports	Lack of qualified staff

different fishing grounds	workshops		
Development and adoption of by-catch reduction technologies	Selection of the best technology for the region; joint experimental fishing with neighbouring countries	Reports of meetings and workshops; proposals for technical solutions	Developed technology might not be accepted by the industry because of substantially reduced shrimp catches and loss of income
Testing of by-catch reduction devices in industrial and artisanal fisheries	Number of vessels involved in the tests; number of relevant research programmes	Reports on experimental fishing cruises; number of fishers accepting the new technology	Same as above
Testing of alternative fishing gears for shrimp fishing	Number of research programmes and experimental fishing cruises	Reports on research and experimental fishing cruises; number of fishers and vessels involved	Lower efficiency of alternative gears; higher cost of fishing operations
Demonstration and training for fishers on by-catch reduction devices	Organisation of training courses	Number of fishers participating in the courses	None
Dissemination of the results to the fishing industry	Number of training programmes; continuous assessment of resources	Number of publications	Lack of funds

ANNEX C

STAP ROSTER TECHNICAL REVIEW

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Key issues

Introduction

The Project is faced with a serious contradiction (tacitly admitted in its text): that of pleasing environmentalists and political ecologists, on the one hand, and fishers, on the other. The former, at best, want the sea bed, and the marine environment in general, not to be disturbed so much and so often as to compromise the sustainability of present levels of biodiversity and of good health of all marine ecosystems. They consider that the "killing" of by-catch that is dumped back into the sea is a means of lowering biodiversity and degrading the marine environment.

The fishers do not want the opposite, but do also want to earn a living by shrimp fishing and cover their fishing-vessel costs, replacement etc.

The fishers sell by-catch, if there is a market for it, so they are not against taking it, but are, nevertheless, against taking by-catch and having to dump it back into the sea (an undesirable operating cost). By proposing to the shrimp-trawler fisheries to introduce by-catch reduction devices, mainly to help other fisheries, without evident reciprocation, GEF is probably placing a serious obstacle in the way of the Project's eventual success.

The honest but rather frequent reference to the probable loss of income (and additional investment) in the short to medium term to the shrimp-trawler fisheries, with only a rather vague promise of longer-term and, one hopes, sustainable income, is also likely to be an impediment to the Project's success at the level of the shrimp fishers.

Scientific and technical soundness of the project

By-catch

Environmentalists do not want, in principle, any by-catch, especially of endangered species. "Inspired" by the ecological movement of recent years, we tend to assume automatically that it is "wrong" or a "waste" to take fish/shellfish etc. from the sea only to dump it back, but the fishable stock is what it is as a result of all causes of death between the birth and death of any individual fish/shellfish. So it is the sum of the causes that counts and the problem becomes one of relating the loss due to fishing to the loss due to other, non-fishing, causes.

The Project proposal refers here and there to "unwanted" by-catch. Who "unwants"? Fishermen at sea may want to keep and sell by-catch, if this is economically advantageous to them, or they may not want it, either in their trawls, in the first place, nor on deck to be dumped back into the sea. But it is quite possible that they want some of it (the sellable) part and not the rest, although they might

not want to sort it on deck (for economic and/or operational reasons); unfortunately, by-catch does not come up ready sorted in the trawl net. Although the idea of not catching unwanted by-catch seems reasonable, the BRDs are not likely to discriminate between wanted and unwanted by-catch, but the Project is aimed at reducing both.

By-catches are incidental and therefore inefficiently caught; the effect on the by-catch species must be considerably less than that on the target species: the impact on the by-catch species may be less important than environmentalists like to think.

The sense of the term "unwanted" is strongly qualified by the viewer. The question is whether it is better (for the environment?) to return by-catch (however substantial) to the sea or better (ecologically and economically?) to let the fishermen take by-catch and sell it (if the appropriate market is there or can be created).

Even if all by-catch could be avoided, the catch of the target species probably would not increase and if it did, overfishing (i.e. loss-making fishing for this species) would be reached much quicker, so that reducing shrimp-trawlers' by-catch may actually help no one—hence the question: Who "unwants"?

Another important point to bear in mind is that what is unwanted today may be wanted tomorrow, especially if useful products based on by-catch can be developed. The Project should not prejudge this matter.

From the figures suggested in the Project proposal, "wanted" by-catch is worth between \$50 and, say, \$500 a ton, and this is described as an economic loss (other than the operational costs of not taking exclusively target species—shrimp, here—or of having to take the trouble to dump by-catch into the sea)? FAO is cited here as saying, in effect, that worthless by-catch—because discarded—is worth billions of dollars. Who loses, and how, is not made clear.

The amount of by-catch per species, in the shrimp fishery, is comparatively small (because a considerable mix of other species is taken in the by-catch), so it is probable that by-catch itself is not a major factor in fish-stock abundance, for a particular species, unless this species is already subjected to heavy commercial fishing in the area of the shrimp fishery; this distinction is not made in the Project proposal and there are no, or at best only vague, references to the association of shrimp and finfish fisheries. More should be said on the relevant finfish fisheries, in the Project's context.

If the Project is part of a concerted international effort to resolve the by-catch problem, a number of questions (implicit or explicit in this Review) need to be answered first; the Project cannot do this, and it is doubtful that any organization, country or group of countries has yet provided satisfactory answers to most of these questions.

Parent/juvenile stock relationship

Much is made throughout the Project proposal of the advantages of reducing, in the by-catch of the shrimp fishery, the amount of juvenile finfish of species which, as adults, are commercially important to the fishing industry as a whole. This may be so, although I do not think that studies carried out by FAO and other concerned institutions have yet proven their case: ecology is far too complex to yield any easy answers. For example, some juvenile finfish feed on shrimp larvae, so their catch/by-catch benefits the shrimp fishery, in principle. Moreover, there is rarely (even never) a clear-cut relationship between the abundance of a parental fish stock and the abundance of the offspring it produces and which survives to join the fishable or the parental stock, because there are so many other factors determining survival (of finfish, for example) in the marine environment. Nor can the relationship be investigated easily in the absence of a broad sampling programme (i.e. a fishery).

The "reduced capture of juvenile fish" may not lead—at all or only slowly relative to Project lifetime—to "increased production of food fish", contrary what is claimed in Annex B.

Environmental impact

The Project is weak in so far as it does not make substantive arrangements for determining the impact of shrimp-trawler fisheries on the marine environment, especially the sea bed. The arrangements indicated in Annex B are very vague for so important a matter.

The Project proposal states "In each of the participating countries the impact on the environment of present production systems will be assessed...". This is a major undertaking, yet nothing is said (in the text, nor in Annexes B and F) of the national or other institutions that would undertake this work.

The participating countries will develop or adapt by-catch reduction techniques "...which reduce the capture of juvenile fish...to an acceptable level." An acceptable level is not defined; nor is it stated who should decide this, nor by what criteria.

The possibility of closed fishing seasons and/or areas is put forward as a basis for relieving the shrimp stock to recover (from fishing/overfishing); it might be added that such seasons would also allow the sea bed to recover from intensive trawling.

There are numerous ecological problems to be solved for the usefulness of BRDs to be properly established. One relevant example is that turtles eat shrimp, so (from the fishers' standpoint) catching turtles (in by-catch) amounts to removing a competitor, but the present "ecological" climate would not accept this idea. Hence the contradictory grounds on which the Project proposal stands.

Identification of the global environmental benefits and/or drawbacks of the project

The benefits, pending favourable results of experimental fishing, are harder to identify than the drawbacks, which are covered in the section on *Scientific and technical soundness of the Project*.

How the project fits within the context of the goals of GEF, as well as its operational strategies, programme priorities, GEF Council guidance and the provisions of the relevant conventions

This is covered, even if only superficially, in the Project proposal. It is arguable that this particular Project should properly have been left to FAO, since it is basically the development, testing and application of by-catch reduction devices to shrimp-trawler fisheries and is comparatively weak on the environmental impact aspects of shrimp fishing without BRDs.

Regional context

The regional coverage of the Project proposal is quite satisfactory.

Replicability of the project (added-value for the global environment beyond the project itself)

A great deal depends on the success of the development, testing and application of BRDs; based on favourable results elsewhere, this replicability seems assured, but the weaknesses of the present Project would have to be faced and removed, for replicability to be fully justified.

Sustainability of the project itself

Again, a great deal depends on the success of the development, testing and application of BRDs; based on favourable results elsewhere, this sustainability may be positive but is not guaranteed by the Project as it stands.

Secondary issues

Linkages to other focal areas

In at least three of the participating countries (Nigeria, Trinidad and Tobago, Venezuela), shrimp-fishing is carried out in areas of petroleum exploration and extraction (and sometimes natural leakage from the continental slope), as well as discharge at sea. The same may be true of others (e.g. Bahrain, Iran, Indonesia). There are sometimes problems of tainting by petroleum components, so there is a potentially strong link between shrimp (and other) fishing and concern for marine pollution. However, the Project proposal does not attach any importance to such aspects of shrimp-trawler fisheries, in spite of the role of these environmental aspects in the economics of the fisheries. The relevant research programmes proposed might consider this relationship.

Linkages to other programmes and action plans at regional or subregional levels

These are reasonably well covered in the Project proposal, although, given the preceding comment, no reference is made to any UNEP Regional Seas Action Plans which may be of some help or provide useful information on the environmental aspects of shrimp-trawler fisheries.

Other beneficial or damaging environmental effects

Perhaps the dumping of substantial amounts of by-catch into a fairly limited area (e.g. Gulf of Venezuela), amounting to local "fertilization" of a shallow water body, would itself be a significant environmental factor, but whether beneficial (e.g. increasing local productivity) or damaging (e.g. induction of red tide) is not, I think, known.

Degree of involvement of stakeholders in the project

The stakeholders are nowhere clearly defined in the Project proposal and their involvement is nowhere precisely stated; in the case of fishers, their participation as stakeholders is apparent; but that of researchers, administrators, investors is vague or absent.

Capacity-building aspects

If the fishers participate willingly in the development and testing of BRDs and in the subsequent experimental fishing, the possibility of increasing their technical capacity and experience will be strong. But they will only do this if, at first, they can be convinced that real socio-economic advantages will flow from this Project, and then convinced by the positive results with the BRDs. The convincing, before the Project produces any results of its own, will come from the dissemination of information on experience elsewhere with such devices: the Project allows for this, but timely execution is essential to success. Much will then depend on the results from the Project itself.

If the participating countries can actually develop and undertake serious scientific and technical research programmes, their researchers will also increase their know-how and experience. The Project's responsibility here is limited, however.

Innovativeness of the project

The Project is straightforward and not particularly innovative. Section 4 of the Project Brief says that already billions of dollars have been invested in development of the technology of by-catch reduction and its testing, in the training of human resources, and in promotion of dialogue and consultations with the fishing industry. Even if not much of it has been in the participating countries in the Project, the experience gained, in so far as it is positive, must certainly be readily applicable in these participating countries. The cost benefit ratio of the Project is therefore open to question.

Additional remarks

In this Project and its follow-up, a lot depends on the availability of good-quality, truthful and sufficient fishing data over the lifetime of the project and beyond, in all the participating countries. In this respect, fishing fleets, vessel captains and others concerned vary considerably, from outright failure to keep fishery statistics at all, to the maintenance of high-class statistics via well kept vessel logbooks made available for inspection by fishery administrators. Much depends on, for example, the confidentiality accorded such statistics, especially if national authorities use them for such purposes as determining taxation, fishing quotas/total allowable catches, governmental subventions etc., and if investors use them to make investment decisions. The situation in each participating country needs to be assessed with a view to improvement where necessary: the possible advantages of introducing BRDs could be "hidden" by false or biased statistics. Sad, but true.

The Project proposal suggests that the adoption of the new technology will enhance the participating countries' shrimp-trawler fisheries so that they will be regarded as more sustainable in the future. The underlined phrase is far too vague in this context and should be replaced with "...as being compatible with the sustainable development of national fisheries." Or something similar; being sustainable is often a matter of fashion, as well as cost, and here the reference must always be to the Commission on Sustainable Development's definition, for which simply "sustainable" or "sustainability" is never an acceptable substitute.

If the idea of the Project is to solve the by-catch problem by developing, testing and introducing BRDs, it is not clear what alternative fishing methods are needed; in any case, they too would need to be developed, tested and introduced anew, which would be more costly and may not solve the underlying problems. The introduction of closed seasons/areas may reduce by-catch, but may also reduce shrimp catch. The basis for affirming that they would ensure the sustainable development of the shrimp or other fisheries must always be established before such an option is tried.

Project implementation

The implementation of the Project is outlined in Annex B; some observations referring to this Annex follow:

Who will verify the achievement of objectives? This is not a simple matter, and some indication of the entities, their capabilities and their resources should be indicated. For the third column "Means of Verification", in several places, who will do the considerable work is not specified, even generically; see for example entries at 4th and 5th outcomes.

For the first outcome, "Objectively Verifiable Indicators", no idea is given of what the priority assigned to "research institutions and administrations" is relative to; nor whether the participating countries can or actually will provide the human and financial resources for this quite enormous task.

For the fourth outcome, "Objectively Verifiable Indicators", regarding hits on the FAO web site, this will depend also on the links to other relevant sites—e.g. FAO itself, UNEP, relevant regional fishery bodies.

The third result (1st column) is too an ambitious an expected "result", considering that improving research at the national level itself is not a specific objective of the Project.

In the "Objectively Verifiable Indicator" for the third result, on the agreements between governments on fishery research, it is important to specify the institutions through which these agreements would be implemented; inter-institutional co-operation in some (probably all) regions is often hard to arrange and even harder to implement. Also, these agreements should be specifically related to "the problems addressed by the Project" and I suggest adding the last phrase in quotation marks to the present text.

Likewise, for the fourth result, research programmes on environmental issues are notoriously expensive, hard to develop and hard to carry out; the Project is not developing them nor paying for them: they might not become a useful "Objectively Verifiable Indicator".

Regarding the "Critical Assumptions and Risks", for the first outcome, "temporary loss of income" is nowhere defined and views on its "duration" may vary widely amongst stakeholders; also, greater effort might be put into making catch, retention, selling of by-catch better, thus making its capture more or less a parallel fishery.

Milestones may not be at all easy to fix; favourable results from experimental fishing may not be well reflected in subsequent commercial fishing. If results of the experimental fishing are mixed, commercial introduction may be greatly slowed. This would certainly compromise the Project objective to reduce by-catch by 50%.

While there is a commitment in the Project proposal to disseminate good results (interim and final), there is no such commitment regarding poor or mixed results, which might be a pity if the results expected—by the shrimp-trawler fisheries (better and sustainable shrimp catches), the environmentalists (reduced by-catch, increased finfish resources, no great environmental impact on the sea bed or on the shrimp resources), potential investors etc. (everything, especially rentability of investment)—were proved wrong, economically and environmentally.

Regarding Economic and Environmental Benefits, Annex A, first paragraph, benefits are hard to estimate before BRDs are tested, adopted and used for a considerable time, so this is a "risk-capital" project. However, experience elsewhere is important and sufficiently general to allow the use of BRDs to be recommended directly to the participating countries, perhaps saving unnecessary costs—unless the Project is actually a disguised subvention to some selected shrimp-trawler fisheries.

The totals for the columns "Baseline" and "Alternate" in Table 1 do not, by my calculator, seem correct.

Project future

For the "Critical Assumptions and Risks" (Annex B) I propose0 new text "That relevant laws and regulations will be complied with by the fishing industry", although this is open to considerable doubt.

For the second result (also Annex B), it is not at all sure that fishery management will be improved; fishery management is a complex and difficult task and goes well beyond the scope and objective of this Project.

IMPLEMENTING AGENCY RESPONSE TO THE STAP ROSTER EXPERT REVIEW

The reviewer provides some valuable and useful points, which have resulted in amendments to the text of the project brief and to the Log Frame Matrix (Reviewers paragraphs: 4, 8, 10, 14, 19, 28, 31, 33, & 34).

UNEP & FAO do not accept however, a number of the points raised by the reviewer which stem in part from the difficulties of producing a consolidated brief of limited size encompassing actions in numerous fisheries where the conditions, both environmental, social and economic, differ quite considerably. For example, the reviewer is correct that, in those fisheries where a market exists for shrimp by-catch the motivation to reduce by-catch is low. Such a situation does not arise in all tropical shrimp fisheries however, in many shrimp trawl fisheries markets for by-catch do not exist and even where they do, on-board freezer space may limit the capacity of the fleet to store by-catch.

The reviewer correctly notes the potential "contradiction" or conflict between the costs and benefits of intervention from the perspective of individual operators and different sectors of the fishing industry. Such difficulties are not confined to this project but are likely to arise in all GEF fisheries projects. The present project attempts to address this apparent contradiction since it will serve as a platform at national and regional levels for conflict resolution between environment and fisheries issues. Globally it is the case that the shrimp industry and fishers alike have recognized the need to address the by-catch problem. This is evidenced by their participation in the preparatory phase of this project and their commitment to implementation of the present full project, despite the admitted potential for economic losses. Some of the positive incentives motivating action include a higher quality of targeted shrimp, reduced costs of operations and an improved image of the fisheries at the international level.

Part of the difficulties raised in the reviewer's comments and indeed the proponents arguments in favour of the project, stem from inadequate information regarding the economic costs and benefits of alternative courses of action. This project will attempt to address this information and data gap through the experimental fishing components. It is FAO's opinion that the reviewer is incorrect regarding the non-discriminatory nature of BRDs. On the basis of past experience BRDs will discriminate between different species components of the by-catch and the project does not focus simply on reduction of all by-catch. The focus will vary between countries and individual fisheries as is indicated in the workplan and timetable where different courses of action are indicated for different participating countries. The overall target is a 50% reduction in by-catch, and the secondary target is a reduction in by-catch of fin-fish juveniles, which is realistic based on FAO experience of previous pilot activities.

A number of the reviewers comments relating to by-catch and parent/juvenile stock relationships are refuted by existing data or can neither be proved nor disproved on the basis of present data and information. It is hoped that during project implementation the bases for the assumptions outlined in the document will become clear. In fact, there is evidence that the amount of by-catch is substantively larger than that of the shrimp fishery, in some cases it may reach 90% of the total catch.

The fact is that the utilization of effective BRDs does not prevent or limit the fishing effort targeting shrimp. The simple reason for their adoption being the necessity to minimise the impact of trawling

on other components of aquatic biodiversity. In spite of great uncertainties regarding the scale and nature of the "biological impact" of trawl fishing, there exists strong evidence that following intensive catch of juveniles, a decrease in the yield of catch of commercial fin fish is observed.

The reviewer raises the fact that this project may duplicate other initiatives and represents part of FAO's mandate. While essential elements of the project may not seem particularly innovative, as several countries have already embraced development of BRD's to different degrees, this represents the first concerted effort at the international level ever undertaken to address this problem, hence the rationale for the present project and its added value. The project proposes to build upon planned and/or executed research on the reduction of by-catch in shrimp trawl fisheries in countries, which include, Venezuela, Mexico, Trinidad & Tobago, and the Philippines. These past experiences are central to the objective of the project of expanding use of BRDs and transferring knowledge and experience regarding best practices. In addition, it remains to be seen which BRD's are developed and/or modified by the present project. These and other aspects may well turn out to be extremely innovative. Benefits arising from the project include, for example, increased knowledge of the fisheries which is pantropical in nature; increased cooperation among stakeholders at the international level; improved management of shrimp fisheries by dissemination at the global level of information on best practices, and replication of project results elsewhere.

Recognising the space limitations of the tabular presentation additions have been made to the extent possible in the log frame matrix. This is a "Project Brief" which obviously does not include all details that will be contained in the operational project document. Annex F is merely a synoptic listing of activities to be carried out and does not detail the arrangements which are included in the related national workplans elaborated by the participating countries themselves, and contained in the national reports prepared under the PDF-B.

UNEP and FAO agree with the reviewer that the problem of by-catch has many facets and environmental impacts may be very broad and require further study. It was felt by participating countries and by FAO that the data and information support intervention focussing on BRDs rather than sea bed impacts, which can only really be addressed by reduction of trawl frequency and changes to management that reduce the frequency and intensity of fishing effort.

With regard to the reviewers comments concerning tainting in trawl fisheries where petroleum extraction also occurs, it is worth noting that, this issue was never raised during the meetings with stakeholders and national coordinators during the execution of the PDF-B. FAO is of the opinion that this issue is not a priority at the present time.

Regarding linkages to the Regional Seas Programme it is worth noting that the Regional Seas Programme of UNEP has not dealt traditionally with commercial fishery issues. Linkages have already been made whenever appropriate through PDF-B activities or other related initiatives of direct relevance to this project such as in the case of ROPME, which serves as Secretariat for the Kuwait Action Plan.

UNEP and FAO do not agree that the stakeholders are nowhere clearly defined in the proposal. It is clearly stated that National Steering Committees will be established in the various participating countries and that, membership will be drawn from a wide range of stakeholders. Obviously the

detailed membership of these committees cannot be provided in all instances in a brief of this length but again are defined in the national workplans published from the PDF-B.

Verification of the project achievements will be done by FAO Task Force, Fisheries Administration and Governmental bodies in the participating countries the log frame matrix has been modified to indicate this.

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ANNEX D

AVAILABLE REFERENCE DOCUMENTS

The following Reference Documents are relevant to the project:

INTERNATIONAL AGREEMENTS AND CONFERENCES

- UN Convention on the Law of the Sea, 1982
- FAO Code of Conduct for Responsible Fisheries, 1995
- United Nations Conference on Environment and Development (UNCED) – Chapter 17 of Agenda 21, 1992
- Convention on Biological Diversity: paragraph 4 of decision II/10 of the Contracting Parties
- The 'Jakarta Mandate on Marine and Coastal Biological Diversity'
- Report of the FAO Technical Consultation on Reduction of Wastage in Fisheries (28 October-1 November 1996, Tokyo). 1997; FAO Fisheries Report 547

DOCUMENTS PRODUCED DURING THE PDF PHASE

- Report of the Workshop of National Co-ordinators of the UNEP/GEF/FAO Project on reducing the impact of tropical shrimp-trawling fisheries on living resources through the adoption of environmentally friendly techniques Rome, Italy, 17-19 March 1999; FAO Fisheries Report 605
- Thirteen national reports on the situation of the shrimp fisheries in thirteen selected countries. 2000 (in press)
- Report of the four GEF/UNEP/FAO regional workshops on reducing the impact of tropical shrimp trawling fisheries. 2000; FAO Fisheries Report 627

ANNEX E

OVERVIEW OF THE SHRIMP-TRAWLING FISHERY IN THE PARTICIPATING COUNTRIES

Bahrain:

335 operational shrimp trawlers of varying sizes, between 5 and 23 m in total length. The shrimp catch was 2 571 tonnes in 1997, which is 25.6% of the total catch of the country. During the period 1980-1997, the maximum shrimp landings were 3 565 tonnes in 1996, while the lowest catch of 752 tonnes was recorded during the Gulf War in 1992. Although it has been known that a significant amount of fish by-catch is captured together with the shrimp, reliable data did not exist prior to an ongoing two-year survey aimed at monitoring such by-catch. Results from this survey have not yet been published. Bahrain has also conducted experiments with a by-catch reduction device during the 1999–2000 season. Indicative figures are a reduction of finfish by 50%, crabs by 10% and with no loss of shrimp catch.

Cameroon:

65 licensed shrimp trawlers mainly operated by “Time Charter” companies, a kind of joint venture with foreign ownership. The official landings of shrimp are only around 500 tonnes/year, but this figure is believed to be an underestimate, as some of the “Time Charter” companies are not declaring the real quantities caught. In addition to industrial trawlers, approximately 200 fishing canoes are exploiting small estuary shrimp (*Nematopalaemon hastatus*) with very-small-meshed conical nets (ngoto). Two-boat trawling is increasing in shallow waters, targeting mainly fish. Shrimp trawlers also catch large amounts of fish as by-catch. Some of the fish by-catch, including a certain amount of juveniles is landed at the local market, but, undoubtedly, a significant amount of low-valued fish and juveniles is also discarded at sea. Capture of juvenile food fish is a threat to sustainable exploitation of demersal fish resources, and trawling in shallow waters creates serious conflicts with artisanal fishers.

Colombia:

Shrimp fisheries on both sides of the country on the Pacific and the Caribbean coasts. On the Pacific coast there are 115 units, mainly small boats, 70% of them operating in coastal areas (where artisanal fishers also exploit shrimp and fish resources with other small-meshed fishing gear). In 1996, 4 139 tons of shrimp were caught on the Pacific side. At the same time the Pacific fishery is developing quickly; it is estimated that the shrimp resources are over-exploited. Recent progress in technology has led to diversification of the fishing effort towards deeper shrimp species. Regarding by-catch, the estimate is 14 664 tons (of which, many juveniles). Normally this by-catch is kept for the local market and in many fishing companies is sold as a bonus for crew members. On the Caribbean coast the fleet consists of various sizes of vessels, but more than half are larger trawlers. In the Caribbean, the shrimp catch in 1996 was 916 tons and it is estimated that the shrimp resource is over-exploited. The fishery is decreasing seriously in terms of catch. The by-catch on the Caribbean side is about 9 868 tons. It is indicated that 4 kg of by-catch is discarded for every kilogram of shrimp.

Costa Rica:

73 trawlers (“Florida type” with outriggers) that operate on the Pacific side of the country. The annual shrimp catch amounts to approximately 2 000 tonnes. The amount of by-catch is estimated at 3 000 t/year, of which around 2 400 t are discarded. There are about 7.5 kg of by-catch for 1 kg of shrimp taken. When fishing in coastal waters, the use of a turtle-excluder device (TED) is mandatory in waters shallower than 80 fathoms. A vessel-monitoring system (VMS) exists. High discard rates, particularly of juveniles, and overfishing of the resources in general, are reported.

Cuba:

Fleet 51 fishing vessels involved in shrimp trawling, mainly at night and with 14 support vessels, which ensure a daily transfer of shrimp and incidental catch to port. The annual catch of shrimp is 2000 tonnes in addition to 11 000 tonnes of fish in a combined trawl fishery. The average trawl catch in recent years has been 6 to 8 kg of fish for 1 kg of shrimp. There is no discard: approximately 22% of the non-shrimp catch are landed for human consumption, the rest is reduced to fishmeal or silage for animal consumption. The shrimp-fishing grounds are well demarcated and there are fishing closures during recruitment seasons, and other regulations exist for reducing fishing effort and for the protection of areas with a known high density of juveniles or large quantities of small-size fish.

Indonesia:

Trawler fleet (1996) of 431 vessels from 19 to 849 GT. Three types of trawl riggings are used: single trawl towed from the stern of the vessel; outrigger twin trawls (two trawls); and outrigger quad trawls (four trawls). According to Presidential Decree No085/1982 all units should be equipped with a by-catch efficiency device (BED), which is a modified form of a turtle-excluder device (TED). The law of 1982 restricts trawling for shrimp to the Arafura Sea (eastern Indonesia). The shrimp catch from that area was approximately 20 000 tonnes, in 1996, which is 10% of the total catch in that area. The remaining catch includes landed as well as discarded by-catches, mainly of fish. Generally, the shrimp/by-catch ratio is 1 to 8-15. The yield from shrimp has more or less levelled off over a long period of observation, but fluctuation is observed from year to year. The catches of demersal and pelagic fish are increasing slightly. The estimate for 1998 is around 200 000 tonnes of by-catch, of which 170 000 tonnes were discarded. Nearly 2/3 of the total landings consist of fish.

Iran:

39 industrial trawlers of 27-m length and 750-hp engines fishing with outriggers (two trawls), approximately 870 wooden vessels of 16-m average length and 100–220-hp engines (dhows) and approximately 1 500 fibreglass boats of 7 m mean length with 25–45-hp engines. The catch of shrimp is approximately 7 000 tonnes. The shrimp trawler catch consists of 10–17% shrimp, 10–25% small fish, 40–60% juvenile fish (less than 30 cm in length) and 10–20% larger fish. Most of the small fish and juveniles are discarded, more so at the start of the season when shrimp catches are good. In Hormozgan province discarding is banned and a collecting scheme for such by-catch has been established. The shrimp-fishing season in each province is approximately six weeks, and opening and closing is based on the maturity and body length of shrimp and percentage (20%) of remaining stock.

Nigeria:

264 licensed trawlers (1999) catching approximately 10 000 tonnes of shrimp per year. By-catch of fish is significant and a system of landing most of these catches has developed rapidly in the country. The shrimp trawlers freeze the valuable catch on board. The remaining fish by-catch is traded at sea through a system in which motorised canoes buy the fish and transport it to shore where it is processed and marketed. This latter practice now involves a significant number of people who make a living from this activity (for some people, this kind of trade now replaces their previous fishing activities); it is also a major source of income for the trawler crew, who are poorly paid (less than US\$ 20 per month). The negative side of this practice is that shrimp trawlers now aim to catch as much fish as possible, often in shallow waters where not only fish but also juveniles are most abundant. As trawling for fish is often conducted in shallow waters where the artisanal fleet operates, conflicts, including damage to gear, are an increasing problem. The control of fishing vessel operations (MCS system) is poorly developed to combat this questionable fishing practice.

Philippines:

Fleet of 445 trawlers, 62% classified as small-commercial (i.e. 3.1 to 20 GT); 37% medium commercial (20.1 to 150 GT) and 1% large-commercial (150.1 GT and above). The annual catch of shrimp is approximately 32 000 tonnes. White shrimp (*Penaeus merguianus*), tiger shrimp (*P. semisulcatus*) and endeavour shrimp (*Metapenaeus ensis*) are the most important species, together with the smaller *Acetes* species which, in weight, constitutes 34% of the total catch. Although the trawl is the most common fishing gear for shrimp, there is a tradition of catching shrimp with gillnets. Discard rates are unknown, but likely to be relatively small, as there is a market for most of the captured fish. It is anticipated that significant proportions of fish by-catch consist of juveniles of valuable food-fish species. The Philippines has developed a set of regulations, but enforcement of these is considered a problem.

Trinidad and Tobago:

Fleet of 126 vessels, of which 19 are industrial trawlers (in 1998) operating, according to existing regulation, offshore in deeper waters while smaller boats fish nearer the shore. The annual landings of shrimp (several species mixed) are around 1 000 tonnes. A significant quantity of finfish, squid and crabs are caught as by-catch (certain species of finfish may be targeted, depending on market demand, or during the wet season when shrimp abundance decreases). According to estimates, the small trawlers discard almost all the by-catch, while larger industrial or semi-industrial trawlers normally keep around 40 % of their by-catch on board. In order to conform with US requirements for shrimp-exporting nations, the large trawlers carry turtle-exclusion devices (TEDs) on board (The local fishery authorities give high priority to the development and introduction of a combined turtle and fish excluder). Existing regulations require a different size of mesh according to whether the trawler targets shrimp or fish. A major concern is overfishing and capture of juvenile (pre-spawning) shrimp. A conflict exists between trawling and other fishing methods (gillnets, pots, demersal long-lining, and handlines), because artisanal fishers blame the trawlers for the depletion of the demersal fish stocks.

Venezuela:

Fleet of 351 trawlers. In 1997, the landings of the shrimp trawlers amounted to 3 665 tonnes of shrimp and almost 20 000 tonnes of fish. The trawl fishery is a combined fishery for shrimp, molluscs and fish. The shrimp component represents between 2.5 and 6% of the general catch. Of the additional catch, 30–35% is normally landed, the remaining 60–65% (mainly fish, with an estimated 80% of juveniles from species of commercial interest) is discarded. In principle, turtle-excluder devices are used on board industrial trawlers (however, significant losses of fish and shrimp are reported). For administrative purposes, the fishing grounds are demarcated into zones with a portion of the fleets authorised to fish in each of them. Technological research has been carried out for a number of years to reduce the discards and assess the impact of the use of excluder devices fixed on the net. In addition, regular surveys are carried out to estimate the amount of by-catch produced by the vessels, its composition, size structure, and geographical distribution. Concern is expressed about overexploitation of shrimp resources, particularly in coastal areas, and the capture of juvenile fish.

ANNEX F
LIST OF ACTIVITIES AND TIMETABLE

COMPONENT Sub-Component																						
Activity	2001			2002			2003			2004			2005									
COMPONENT A. GLOBAL INFORMATION ON SHRIMP FISHERIES																						
A.1 Electronic publication on shrimp-fishing methods		■	■	■																		
A.2 Inventory of by-catch reduction devices (BRDs)		■	■																			
A.3 Annual reports by countries on their shrimp fisheries						■			■			■							■	■		
A.4 Inventory of legal and policy frameworks for sustainable shrimp fisheries		■	■																			
A.5 Guidelines and information on sustainable shrimp fishing technology		■																				
A.6 Directories of experts and institutions experienced in this field		■																				
COMPONENT B. NATIONAL LEVEL ACTIONS TO INTRODUCE MORE-SUSTAINABLE PRACTICES																						
B.1 Introduction of sustainable shrimp-fishing technology in Nigeria																						
B.1.1 Problem identification concerning by-catch																						
B.1.1.1 Socio-economic studies of by-catch trading		■																				
B.1.1.2 Resource assessment/distribution surveys			■	■	■	■																
B.1.1.3 Underwater mapping of fishing grounds			■	■	■	■																
B.1.2 Development/adaptation of by-catch reduction technologies																						
B.1.2.1 Selection of appropriate by-catch technologies for testing		■																				
B.1.2.2 Testing of BRDs on commercial trawlers			■	■	■	■				■	■	■										
B.1.2.3 Evaluation of experimental results									■													
B.1.3 Introduction of by-catch reduction technologies																						
B.1.3.1 Local production of BRDs										■	■											
B.1.3.2 Introduction of BRDs to the fishing fleet, including production of the relevant extension material										■	■	■	■	■	■	■	■	■	■	■	■	■
B.1.3.3 Fishing regulation and MCS																						
B.2 Introduction of sustainable shrimp-fishing technology in Iran																						
B.2.1 Problem identification concerning by-catch																						
B.2.1.1 Training of observers		■																				
B.2.1.2 Surveys of seasonal and spatial catch composition			■	■	■	■																

PROJECT REVIEW SHEET
Work Program Inclusion - UNEP International Waters

Project Title: " Global: Cameroon, Costa Rica, Columbia, Cuba, Mexico, Indonesia, Iran, Nigeria, Trinidad & Tobago, Philippines & Venezuela: Reduction of Environmental impact from tropical shrimp trawling through introduction of by-catch reduction technologies and change of management."

Date: September 5, 2000

	Work Program Inclusion per criteria established in Draft # 8 of the project review criteria	Reference Paragraphs and Explanatory Notes:
1. Country Ownership		
• Country Eligibility		• Countries are eligible under paragraph 9b of the GEF Instrument – see cover page
• Country Drivenness	Clear description of Project's fit within: <ul style="list-style-type: none"> • National reports/communications to Conventions • National or sector development plans. • Recommendations of appropriate regional intergovernmental meetings or agreements. 	<ul style="list-style-type: none"> • National Priorities were identified during the PDF-B phase and are detailed in the 13 national reports which are in press – see Annex D • Regional priorities were identified during four regional workshops – see Annex D, FAO Fisheries Report 627 • All countries are signatories to the FAO “Code of conduct for responsible fisheries”.
• Endorsement	• Endorsement by national operational focal points	<ul style="list-style-type: none"> • All participating countries endorsed the original PDF-B in 1997. • All countries with the exception of Costa Rica had endorsed by 21st September. See cover page & Annex G
2. Program & Policy Conformity		
• Program Designation & Conformity	Describe how project objectives are consistent with Operational Program objectives or operational criteria	• The project is fully consistent with the objectives of Operational Program #10, - see para 1.

	Work Program Inclusion per criteria established in Draft # 8 of the project review criteria	Reference Paragraphs and Explanatory Notes:
<ul style="list-style-type: none"> Project Design 	<p>Describe:</p> <ul style="list-style-type: none"> Sector issues, root causes, threats, barriers etc affecting global environment Project logical framework, including a consistent strategy, goals, objectives, outputs inputs/activities, measurable performance indicators, risks and assumptions Detailed description of goals, objectives, outputs and related assumptions, risks and performance indicators Brief description of project activities, including an explanation how the activities would result in project outputs (in no more than 2 pages) Global environmental benefits of the project. Incremental cost estimation based on the project logical framework Describe project outputs (and related activities & costs) that result in global environmental benefits Describe project outputs (and related activities & costs) that result in global and national environmental benefits Describe project outputs (and related activities & costs) that result in national environmental benefits Describe the process used to jointly estimate incremental cost with in-country project partner Present the incremental cost estimate. If presented as a range, then a brief explanation of the challenges and constraints and how these would be addressed by the time of CEO endorsement 	<ul style="list-style-type: none"> Sector issues, root causes, threats and barriers are comprehensively described in the FAO Report No 627 where the results of regional consultations are detailed. An overview of the shrimp trawl fisheries and associated problems of by-catch and discards in participating countries is provided in Annex E. The global significance of shrimp trawl by-catch is outlined in para 2, the majority of which is generated by tropical shrimp trawl fisheries. Barriers to non-adoption of more sustainable practices include <i>inter alia</i>, economic barriers to adoption of BRDs; difficulties in accessing information regarding such technologies; and financial disincentives at the scale of the trawl operator to their application. – see par. 26, Annex A. A detailed logical framework is included as Annex B. Objectively verifiable indicators include: numbers of vessels adopting BRDs; published regulations and laws; increased production of commercial fin-fish; monitoring data showing reduction in discards and unacceptable by-catch such as turtles. The overall goals are to: improve the availability of technical information and advice regarding BRDs; strengthen national management; and to improve integration of biodiversity concerns into shrimp trawl fisheries management. – see paras 10-12 & Annex B Activities are grouped into 4 major components and include: development and dissemination of information; national level actions; regionally co-ordinated actions and overall project co-ordination and management. – see paras 16-22 & Annex F Outputs that result in global and regional environmental benefits are those that address by-catch and discard reduction; adoption of BRDs by individual trawls and entire fisheries; and enhanced awareness at all levels regarding the problems of shrimp trawl by-catch. Outputs that result in national and global benefits include: results of experimental trawls that demonstrate enhanced product quality; potentially enhanced fin-fish catch as a consequence of reduced

	Work Program Inclusion per criteria established in Draft # 8 of the project review criteria	Reference Paragraphs and Explanatory Notes:
	endorsement.	<p>catch of commercially important fish fry.</p> <ul style="list-style-type: none"> • National disbenefits include reduced shrimp catch, and reduced income from sale of by-catch resulting in reduced foreign exchange earnings in the trawl fishery sector. • There are no outputs or activities that result solely in national environmental benefit. • Estimation of incremental cost is described in paragraphs 30 – 33 and in Annex A in which it is noted that environmental benefits are difficult to quantify in dollar terms. • A variety of economic disincentives to adoption of more sustainable practices apply at the present time and the project aims to overcome these barriers in part by demonstrating longer term environmental and economic benefits from the use of BRDs. The agreed costs of actions have been discussed and analysed at both the national and regional levels and significant participation of the private sector is envisaged. – see par 26, Table 2 & Annex A.
<ul style="list-style-type: none"> • Sustainability (including financial sustainability) 	Describe proposed approach to address factors influencing sustainability, within and/or outside the project to deal with these factors	Issues regarding sustainability are discussed in para 21 in which it is noted that increasing international pressures may result, in the medium to longer term, in global market forces demanding the adoption of such techniques for by-catch reduction. It is anticipated that once the benefits of adoption of the technology can be adequately demonstrated in particular fisheries then the spread of the technology should be rapid.
<ul style="list-style-type: none"> • Replicability 	Describe the proposed approach to replication (for e.g. dissemination of lessons, training workshops, information exchange, national and regional forum etc.) (could be within project description)	<p>Replicability of demonstration activities in particular fisheries will be promoted through involvement of trawl fishers from other countries in join experimental fishing and provision of opportunities for regionally based exchange of information and experience in the application of the chosen techniques and technologies – see para 18.</p> <p>Through its regular programme activities and the global information dissemination components of this project FAO will facilitate easier access to information and advice thus enhancing adoption of appropriate technologies throughout the industry – see para 16</p>
<ul style="list-style-type: none"> • Stakeholder Involvement 	<ul style="list-style-type: none"> • Describe how stakeholders have been involved in project development 	<ul style="list-style-type: none"> • Primary stakeholders include governments, the private sector and individual trawl operators who have been involved in regional expert

	Work Program Inclusion per criteria established in Draft # 8 of the project review criteria	Reference Paragraphs and Explanatory Notes:
	<ul style="list-style-type: none"> Describe the approach for stakeholder involvement in further project development and implementation 	<ul style="list-style-type: none"> meetings throughout the PDF-B phase – see paras. 23-26. Regional expert meetings have involved participation of private sector interests and national institutions.
<ul style="list-style-type: none"> Monitoring & Evaluation 	<ul style="list-style-type: none"> Describe how project design has incorporated lessons from similar projects in the past Describe approach for project M&E system, based on the project logical framework, including the following elements: Specifications of indicators for objectives and outputs, including alternate benchmarks, and means of measurement. Outline organisational arrangement for implementing M&E Indicative total cost of M&E (may be reflected in total project cost). 	<ul style="list-style-type: none"> Project design has benefited from FAO experience in the development and operation of its regular programme activities concerned with addressing the globally important issue of fisheries by-catch. Indicators for individual objectives and outputs are described in Annex B and include <i>inter alia</i> national reports of reduced discard levels; increased finfish production; numbers of vessels adopting new technologies; published regulations and laws; introduction of new management regimes. See Annex B. Monitoring of project progress will be the primary responsibility of the Task Manager, the FAO internal Task Force, and the UNEP Bureau of Fund Management Services. Monitoring will be undertaken via Quarterly Operational Reports, half yearly and end of year financial and substantive reporting in accordance with UNEP & FAO internal guidelines for project monitoring and evaluation. See para 34 Milestones are established para 35 for determining project progress towards expected outcomes at the national level. A terminal evaluation will be conducted within three months following closure of project activities. The indicative total cost of the M&E related activities is ##### and is included within the Implementing Agency Fee.
3. Financing		
<ul style="list-style-type: none"> Financing Plan 	<ul style="list-style-type: none"> Estimate total project cost. Estimate contribution by financing partners. Propose type of financing instrument 	<ul style="list-style-type: none"> Total Project cost is estimated at 9.22 million US\$ - see cover page and framework budget Table 2. Estimated contribution from financing partners is 4.49 million US\$ - see cover page Grant financing
Implementing Agency	Propose IA fee	<ul style="list-style-type: none"> 507,309 US\$ according to the fee formula

	Work Program Inclusion per criteria established in Draft # 8 of the project review criteria	Reference Paragraphs and Explanatory Notes:
Fees		<ul style="list-style-type: none"> 50,000 premium due to the global nature of the project supervisory costs are anticipated to be greater (20,000) than for single country projects. In addition monitoring and evaluation costs are anticipated to be of the order of 30,000 US\$ greater than allowed for in the fee since independent evaluators will have to visit five regions and 11 countries.
<ul style="list-style-type: none"> Cost-effectiveness 	<ul style="list-style-type: none"> Estimate cost effectiveness, if feasible Describe alternate project approaches considered and discarded 	<ul style="list-style-type: none"> It is not feasible to estimate the cost-effectiveness of the entire project due to the nature and diversity of the proposed interventions. Cost effectiveness of alternatives for specific technologies will be undertaken within the context of the experimental fishing trials and applied during final selection of gear in each fishery. The project proponents are unaware of any other realistic approach to regionally co-ordinated action that could be adopted to achieve the desired outcomes.
4. Institutional Coordination & Support		
IA Coordination and Support <ul style="list-style-type: none"> Core commitments & Linkages 	Describe how the proposed project is located within the IA's <ul style="list-style-type: none"> Country regional/global/sector programs GEF activities with potential influence on the proposed project (design & implementation) 	<ul style="list-style-type: none"> The project is to be implemented within the framework of FAO's programme in support of the Code of Conduct for responsible fisheries. Significant co-financing at the global and co-ordination levels is provided through FAO support to the global information development and dissemination activities of Component A. see para 16. The project serves as a model for technology transfer in the fisheries industry and has derived benefit from a number of earlier national level activities – see paras 5 & 9.
<ul style="list-style-type: none"> Consultation, Coordination and Collaboration between IAs, and IAs and EAs, if appropriate. 	<ul style="list-style-type: none"> Describe how the proposed project relates to activities of other IAs and 4 RDBs in the country/region. Describe planned/agreed coordination, collaboration between IAs in project implementation. 	<ul style="list-style-type: none"> Fisheries directed activities funded by the GEF are limited in scope at the present time, nevertheless in the activities involving trawl fisheries that are the subject of this intervention, attempts will be made to link to other GEF-IW interventions as appropriate.
5. Response to Reviews		

	Work Program Inclusion per criteria established in Draft # 8 of the project review criteria	Reference Paragraphs and Explanatory Notes:
Council	Respond to Council comments at pipeline entry	None received.
Convention Secretariat	Respond to comments from Convention Secretariat.	N/A
GEF Secretariat	Respond to comments from GEFSEC on draft project brief.	Minor modifications made at the request of the Secretariat. The project is submitted under OP 10 at the request of the Secretariat.
Other IAs and 4 RDBs	Respond to comments from other IAs, 4RDBs on draft project brief.	Comments received from the Worldbank & responded to on 19 th September. Changes introduced to the brief & other technical points will be addressed during the finalisation of the operational project document
STAP	Respond to comments by STAP at work program inclusion.	None received
Review by expert from STAP Roster	Respond to review by expert from STAP roster	Review received 5 th September response prepared and included in Annex C1. Changes made to the logframe and text of the brief. 21 st September.