

PROPOSED REVISED OUTLINE

National Report on by-catch management and reduction of discards *Please do not exceed 50 pages (+ annexes)*

SECTION 1: OVERVIEW AND SCOPE OF PROJECT

I. National overview of trawl fisheries (all fisheries):

1.0 Overview of (bottom) trawl fisheries:

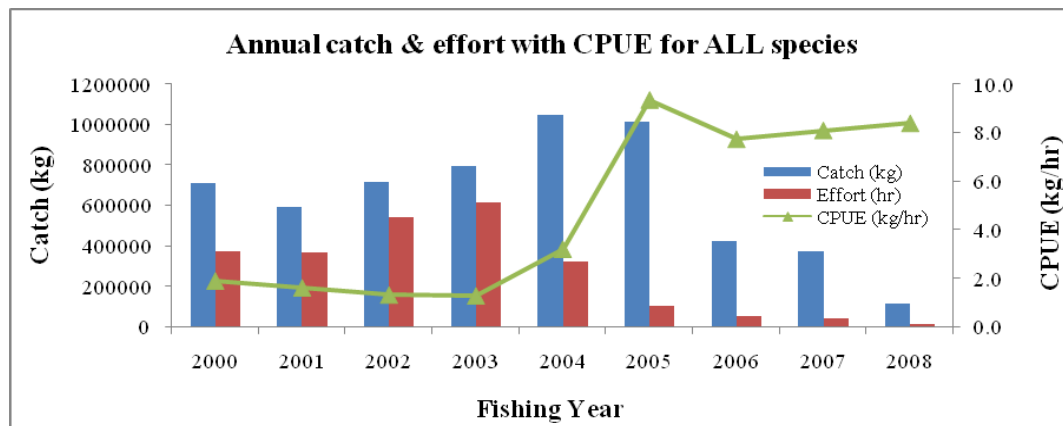
i) Locations, types and estimated number of vessels, fishing effort

- *There are 3 bottom trawl fisheries in PNG and these fisheries are located in the Gulf of Papua (Gulf Province), Orangerie Bay (Milne Bay Province) and Torres Strait (Western Province).*
- *The vessel types used in the 3 fishery are otter trawlers, except for 3 stern trawlers presently introduced in the Gulf of Papua Prawn fishery. The otter trawlers are twin and quad rigged, while the stern trawlers are single rigged.*
- *The Gulf of Papua Prawn Fishery has 15 licensed prawn vessels followed by Torres Strait Prawn Fishery with 7 vessels and 2 vessels in Orangerie Bay Prawn Fishery. At present, only the GOPPF is operating while Torres Strait and Orangerie Bay are not.*
- *The fishing effort in the GOP has been fluctuating over the last 9 years (2000-2008; Table 1) mainly due to the high costs of fuel coupled with falling export price of prawns and the aging of vessels that has resulted in the continuous break down of vessels. As new and more efficient vessels replace them, their effectiveness and efficiency in catching prawns will increase.*

Table 1. Annual catch and effort with catch rate (CPUE) for ALL species

Year	No. Month Fished	No. Vessel Fished	Catch (kg)	Catch (tonnes)	Effort (hr)	CPUE (kg/hr)
2000	12	12	711589.3	711.6	373930.8	1.9
2001	12	15	595776	595.8	368313.5	1.6
2002	12	17	718127	718.1	543667	1.3
2003	12	18	795953	759.9	619273	1.3
2004	12	15	1046683	1046.7	326951	3.2
2005	12	12	1017000	1017.0	109034.2	9.3
2006	11	9	428592.5	428.6	55541	7.7
2007	11	8	374746.6	374.7	46401	8.1
2008	7	5	119638	119.6	14295.5	8.4

Figure 1. Annual catch and effort with catch rate (CPUE) for ALL species



ii) Catch quantities, catch values, species harvested and production trends

- *The quantities of prawn captured per year vary considerably (Table 1) depending on the number of vessels actively fishing, the fishing efficiency of the vessels, prawn abundance and the skills and fishing experience of vessel skippers (Captains) in locating the right fishing spot.*
- *The catch value for all prawn species annually is estimated to be K15 million (US \$5 million).*
- *Prawn species harvested in the Gulf of Papua is the white banana prawn (Penaeus merguensis), Indian banana prawn (P. indicus), Giant tiger/Black tiger prawn (P. monodon), Green endeavor (Demon) (Metapenaeus demani), Red endeavor (Metapenaeus ensis), Grooved tiger (Penaeus semisulcatus), Brown tiger (P. esculentus), Japanese tiger (P. japonicas), Coral prawn (Metapenaeus wellsi), Flower prawn (Parapeneiopsis sculptilis), Pink card (Heterocarpus spp), Orange prawn (Atypopenaeus formosus), and Rooster prawn (Metapenaeopsis lamellate).*
- *There was a sharp increase in prawn production from periods 2000-2005 than drastically decline the following years (Table 1 & Fig 1).*

2. Overview of employment in the trawl fisheries sub-sector

i) Estimated number of jobs onboard vessels

- *The average number of jobs available on each prawn vessel is 17, and this comprises the Captain, chief officer, chief engineer, assistant engineer, chief cook, bossen, assistant bossen, tally man, quality controller and processors.*

ii) Estimated number of jobs in post-harvest and other auxiliary activities

(Above to be by gender, if available)

- *The average number of jobs in post-harvest and other auxiliary activities is seven (7) and this comprises the bossen, assistant bossen, quality controller and the processors.*
- *There was one woman engineer who worked for three years and then resigned from the company due to ethical problems. Since then the job has been male dominated and no female was allowed to work on prawn vessels.*

3. Distribution / marketing of catch nationally and for export

i) National consumption species

- *Species consumed nationally are mainly the endeavor prawns and mixed prawns, including the soft/ broken prawns of all species. These prawns are of low value so are sold domestically.*

ii) Species (and /or size/quality considerations) for reduction or animal feed

- *Prawn species that can be considered for reduction or animal feed are the national consumption species.*

iii) Export Species

- *Prawn species that are for the export markets are the Banana and Tiger prawn species. These species are exported to mainly Japanese and Australian markets.*

4. General condition of coastal trawl resources

i) Status of stocks

- *The biomass of the fishery at Maximum Economic Yield (MEY) and Maximum Sustainable Yield (MSY) is 800 tonnes and 650 tonnes respectively. These figures have never been reached over the last 9 year (2000-2008) (Fig. 1) therefore the fishery is still underdeveloped. In order to maximize returns, harvest must increase.*

ii) Quantities of low value / trash fish captured

- *About 90 percent of catch makes up the by-catch and of this about 10 percent is retained and 80 percent is low value fin-fish, which are either consumed by the people or discarded into the sea as trash fish.*

II. Scope of project

1. Problem statement – what are the problems and issues with by-catch in trawl fisheries?

Overview at national level–brief description here to be elaborated at the end of section 2

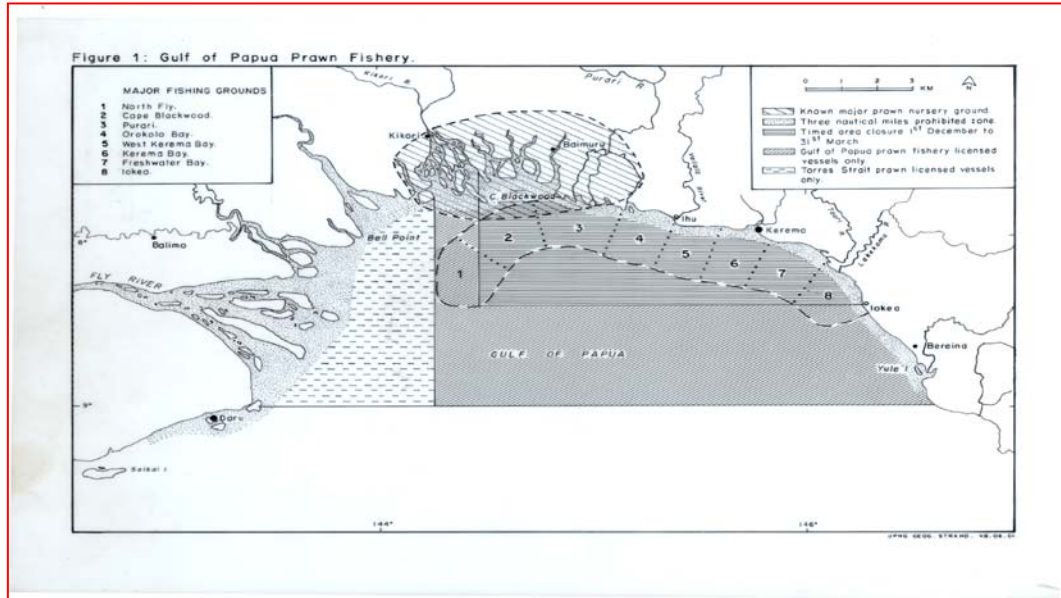
- *Resource Owners Perspective*
 - *Large quantity of by-catch will be reduced using the appropriate technology and this will drastically affect the lives of resource owners utilizing these resources, in terms of loss to food and income.*
- *Prawn Industry Perspective*
 - *The fishers will not be catching large fishes, which they normally substitute for low prawn catch to make up for the loss in their export value.*
 - *The fishers will be drastically reduced as a result of high escape rates.*
 - *The lives of fishers will be threatened as a result of not giving enough by-catches to resource owners, who think by-catches are legitimately theirs to take as a form of compensation for the use of their resources.*
- *Provincial Government Perspective*
 - *The un-utilized or unused fish discarded to seas and not consumed by larger marine animals and washed to shore causing pollution to the environment and health related problems.*
 - *The utilization of by-catch as fish feed for aquaculture developments*
- *National Government Perspective*
 - *The capture of large quantities of commercially valuable juvenile fin-fish species, which may grow to larger valuable sizes. The large size fish species might be able to supply a local fin fish fishery based on these species.*
 - *The capture of long-lived fish species will in turn result in an increase in short-lived fish population and this will have biological and economical implications on the marine ecosystem and users of the resource respectively.*

2. Proposed scope of the project

i) Location and type(s) of fishery (ies)

The location of the project is in the Gulf of Papua Prawn Fishery as indicated in figure 2 below.

Figure 2. Map of the Gulf of Papua Prawn fishing area



ii) Problems to be addressed

The problems to address are;

- *The capture of large volume of by-catch fin-fish and other marine animal.*
- *The capture of large quantities of juvenile fishes of long-lived species, which has a biological and economic significance.*
- *The capture of commercially valuable juvenile fin-fish species, which can be allowed to grow to legal size for greater economic gain.*
- *The unused by-catch (trash fish) discarded into the seas, thus resulting in polluting the environment and causing health related problems.*
- *The impact of the LNG project on the prawn fishery and the by catch species*

iii) Beneficiaries and stakeholders

- *The project will directly benefit the resource users (prawn operators) and the resource owners.*
- *The stakeholders will include the prawn operators, resource owners, the Provincial Government and the National Government (NFA), including the Non-Government Organizations..*
- *It is hoped that the PNG LNG project will also be participating in the project and will also benefit from the findings of the project.*

3. Justification for the choice of project scope:

i) How will it solve (part of) the stated problem

- *The problem will be solved by the introduction of an appropriate technology (ies) that will reduce the by-catch to an acceptable level where resource owners and resource users will still continue to benefit from the by-catch at the same time fulfilling the objectives of the projects so there is a win-win situation for all parties involved. The benefit of the technology will include;*
 - *Increasing catch in prawns and improving quality of prawns to accrue greater economic value so there is no need for the companies to capture large quantities of fin-fish to compliment for the low prawn catch.*
 - *Reducing capture of economically important juvenile fishes of long-lived species to increase its population for greater economic gain.*
 - *Protection and conservation of marine species bio-diversity on a nation, regional and global level.*
 - *Identify and address issues or problems that the PNG LNG project might cause for the prawn fishery and the by catch species of this fishery.*

ii) How does it relate to country priorities/national and regional policies and strategies

iii) Representativeness - nationally and regionally

iv) Challenges and opportunities

- *The challenges and opportunities will include;*
 - *The need for carrying out surveys and assessments of the prawn resource and the resource area the result will feed the planning, management and development strategies*
 - *The lack of both biological and economic data on by-catch – more needs to be known before strategies for by-catch management can be defined. Data need to be collected on by-catch composition, volumes, values and utilization in order to evaluate its possible impact on fishery resources, livelihoods and security.*

SECTION 2: BASELINE DATA

I. Description of the fishery (ies) to be part of project:

1. Description of main fleet segments

- *There are 15 prawn vessels currently licensed to operate in the Gulf of Papua Prawn Fishery (GOPPF) and they belong to seven (7) local companies. The details of these vessels are in Table 2 below.*

i) Location: major fishing ports or landing sites

- *The major fishing port or landing site is the main wharf in Port Moresby and a minor one in Kerema, Gulf province.*

ii) Fishing grounds: areas of operation/fishing grounds, seabed types and depth ranges

- *The area of operations/fishing grounds in the Gulf of Papua Prawn Fishery is the North Fly, Cape Blackwood, Purari, Orokolo Bay, West Kerema Bay, Kerema Bay, Freshwater Bay and Iokea (Fig 2).*
- *The fishing grounds extend seaward to approximately 40 meter depth contour, where trawling takes place mostly along the depth contour of 10-35 meters.*
- *The seabed in the Gulf of Papua is comprised almost entirely of very soft clays and silts.*

iii) Vessels: number of vessels and type and size of vessels

- *There are 15 prawn vessels currently licensed to trawl in the GOPPF.*
- *These prawn vessels are otter trawlers, except for 3 stern trawlers.*
- *The size and details of these vessels are presented in Table 2 below.*

Table 2. The prawn companies and details of their vessels.

Company	Vessel Name	Type of Vessel	Overall Length(m)
<i>Gulf Papua Fisheries</i>	<i>Gulf Star 1</i>	<i>Quad rigged</i>	<i>24.45</i>
<i>Gulf Papua Fisheries</i>	<i>Gulf Star 2</i>	<i>Quad rigged</i>	<i>24.45</i>
<i>High Energy</i>	<i>Mamori</i>	<i>Single rig</i>	
<i>High Energy</i>	<i>Lare Mori</i>	<i>Single rig</i>	
<i>High Energy</i>	<i>Keauta</i>	<i>Single rig</i>	
<i>Sengus Investment</i>	<i>Charisma</i>	<i>Quad rigged</i>	<i>21.36</i>
<i>Sengus Investment</i>	<i>Ipali</i>	<i>Quad rigged</i>	<i>21.36</i>
<i>Yuwan Fisheries</i>	<i>Apurel</i>	<i>Quad rigged</i>	<i>25.92</i>
<i>Yuwan Fisheries</i>	<i>Lopambo</i>	<i>Quad rigged</i>	<i>23.36</i>
<i>GMI Pty Ltd</i>	<i>Lavai No.1</i>	<i>Twin rigged</i>	<i>27.83</i>
<i>GMI Pty Ltd</i>	<i>Lou Aro</i>	<i>Twin rigged</i>	<i>27.83</i>
<i>Siwi Shipping</i>	<i>Siwi</i>	<i>Quad rigged</i>	<i>29.30</i>
<i>Nicoland Seafood</i>	<i>Regina</i>	<i>Quad rigged</i>	<i>26.50</i>
<i>Nicoland Seafood</i>	<i>Diana</i>	<i>Quad rigged</i>	<i>25.60</i>
<i>Elema</i>	<i>High Energy</i>	<i>Quad rigged</i>	<i>26.77</i>

iv) **Fishing gears and vessel arrangements**

See Table 2.

v) **Ownership and crew structure (e.g. owner operated, hired crew or else)**

- *The 15 prawn vessels licensed to fish in the GOPPF are fully nationally owned.*
- *The crew members on each fishing vessel are full-time workers and comprises of 1 captain (either a national or an expatriate), 1 chief officer (national), 1 chief engineer (expatriate), 1 assistant engineer (national), 1 bossen (national), 1 assistant bossen (national), 1 tallyman (national), 1 quality controller (national), and the remaining crews are processors (nationals).*

vi) **Employment and fishing communities:**

- **Total number of crew per vessel (men; fulltime/part-time/seasonal employment)**
 - *The number of crews employed per vessel by each company is around 14-18 and these are all males working on full-time bases (Table 3).*
 - *No females are employed to work on prawn trawlers because of ethical problems.*
- **Employment in post-harvest activities (men/women; full-time/part-time/seasonal employment)**
 - *Apart from the Captains, chief officer, cookies and engineers, all crew members conduct post-harvest activities and they are all males working full-time.*
- **Crew remuneration system**
 - *The national crews are paid normal fortnightly salary, except for the expatriates on monthly basis. Other additional allowances includes; sea going allowance, fish bonus and fillet bonus.*
- **Profile of fishing community livelihood strategies: other jobs fishers and fish workers engage in if not fulltime fishers, and other economic activities of concerned households**
 - *When fishers and fish workers are not working fulltime, they engage in selling betel nuts, marketing garden foods and fishing activities.*

Table. 3. Name of vessel and number of crew employed

<i>Name of Vessel</i>	<i>Number of Crew Employed</i>	<i>Employment (F/P)</i>
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<i>Gulf star 1</i>	15	<i>Full times</i>
<i>Gulf Star 2</i>	14	<i>Fulltime</i>
<i>Mamori</i>	14	<i>Fulltime</i>
<i>Laremore</i>	14	<i>Fulltime</i>
<i>Keauta</i>	16	<i>Fulltime</i>
<i>Charisma</i>	16	<i>Fulltime</i>
<i>Ipali</i>	16	<i>Fulltime</i>
<i>Apurel</i>	16	<i>Fulltime</i>
<i>Lopambo</i>	15	<i>Fulltime</i>
<i>Lavai No.1</i>	15	<i>Fulltime</i>
<i>Lou aro</i>	18	<i>Fulltime</i>
<i>Siwi</i>	15	<i>Fulltime</i>
<i>Regina</i>	15	<i>Fulltime</i>
<i>Diana</i>	15	<i>Fulltime</i>
TOTAL	224	Fulltime

v) **Catches**

- Catch composition (retained catch and discards catch, share of economically valuable catch/trash fish)
 - *The catch composition per vessel comprised almost 90 percent by-catch and 10 percent prawns.*
 - *For vessels having quad rig, their estimated by-catch is xxx mt/year, whilst*
 - *For vessels having quad rig, their estimated by-catch is over the range of 9,000 to 17, 000 mt/year. From the 70 percent, 20 percent makes up the larger fin-fishes (which the company retains), while the 50 percent makes up the juvenile and smaller size fishes (which are normally discarded into the seas or taken by the locals).*
 - *The catch composition per vessel comprised almost 90 percent by-catch and 10 percent prawns.*
 - *Of the 90 percent by-catch, 20 percent is retained and sold domestically while 70 percent is discarded.*

- Variation in catch composition by season
 - *During off-season, the catch composition of prawn decrease with increasing by-catch, while the opposite is seen during the fishing season.*
- Retained catches composition by species and size
 - *The retained catch composition mostly include species of the family Mullidae, Serranidae, scombridae, Carangidae, Lutjanidae, Polynemidae.*
- Discarded catch amounts by species (including corals and seabed structure/organisms)

See Table 3.

vi) Catch utilization and marketing

- Value of catch/by-catch-including trash fish)
 - *The value of by-catch range from K3-5 per kilo depending on the species*
- Utilization of catch/by-catch, including trash fish (local human consumption/reduction or animal feed/exports)
 - *All by-catch are consumed locally, except for some exported overseas.*
 - *No by-catch is currently utilized for animal feed but will be useful later with the increasing aquaculture developments (activities) taking place in the country.*
- Details on by-catch utilization (products/value chain/end consumers)
 - *By-catch fin-fish of reasonable sizes are collected from the deck, placed on trays, freeze in ice than packed and brought to port and sold domestically at prices ranging from K3-5 per kilo.*
 - *Some of the by-catch is exported to overseas at US\$ 2.00 per kilo.*
- Importance of catch/by-catch from a food security perspective
 - *The low income earners in urban areas are 100 percent utilizing by-catch as food and to supplement for their protein.*
 - *The resource owners are also 100 percent utilizing the by-catch for protein and also trading it with villages inland to exchange for garden foods.*

vii) Fisheries policy and regulatory framework

- Relevant regional/national/local fisheries and marine environment policies and strategies (*description of relevant parts*)

- *The National Fisheries Act (1998), Fisheries Regulations (2000) and Gulf of Papua Prawn Fisheries Management Plan*
- Relevant regional/national /local policies and strategies on poverty reduction and food security (*description of relevant parts*)
 - ?
- International and regional committee relevant to by-catch management and discards reduction (*description of relevant parts*)
 - ?
- Relevant government institutional structure (ministries, departments, coordination arrangements).
 - ?
- Review of legal definitions and terms related to by-catch and discards
 - ***Total catch** is defined as the total quantity of marine life captured by the fishing gear and which reaches the deck*
 - *The **discarded catch** is that part of the total catch which is unwanted and returned to the sea.*
 - *The **retained catch** is that part of the total catch that is landed. This retained catch can be further subdivided into a **target catch** and an **incidental catch** component, with the target catch being the primary species targeted by the fishery and the incidental catch being the non-targeted landed catch.*
 - ***By-catch** consists of both the incidental catch and the discarded catch and can be defined as ' that part of the catch which is not the primary target of the fishing effort (Clucas, 1977). In the commonwealth **by-catch** is described as the part of the catch which is returned to the sea either because it has no commercial value or because regulations preclude it being retained, and the part of the catch that does not reach the deck of the fishing vessel but is affected by interactions with the fishing gear.*
- Legislation and regulations (e.g., executive orders, decrees etc) – current and proposed – related to trawl fisheries and by-catch management
 - *The use of Turtle Excluding Device (TED) and By-Catch Reduction Devices (BRDs) in prawn fishing nets have been legislated in the prawn management plan.*
 - *TED's have been manufactured and supplied to prawn operators but is not yet implemented.*
 - *BRD's is not yet developed but is currently proposed to be developed for implementation.*

- Relevant national/local legislation with regard to decentralization of fisheries management, co-management arrangements and spatial management (e.g., fisheries refugia)
 - ?
- Review of management measures applied to the concerned fleets (s) (*as defined in Scope of project above*)
 - i) Licensing schemes
 - *The acquiring of a licensing of a vessel is through the process of an application.*
 - *The application is reviewed by the license review committee.*
 - *After fulfilling all the requirements, the application is forwarded to the Managing Director for signing.*
 - *A fee of K1000 is paid to collect the license.*
 - *The license is renewed every year.*
 - ii) Effort control
 - *Fishing effort is controlled by the limited number of prawn licenses allocated to the fishery and in the case of GOP it is from 15 to less than 10 licenses.*
 - iii) Closures (by area and by season), MPAs
 - *The prawn fishery management area is closed from 01st December to 31st March annually.*
 - *With the management area, industrial fishing is prohibited within the 3-mile zone at all times.*
 - *With accessing of the 2-mile zone, there shall be a seasonal spatial closure from 01st December to 31st December annually.*
 - iv) Gear regulations to improve species and size selectivity

The gear restrictions for the industrial fishery include;

 - *Vessels not exceeding 30 meters overall (LOA)*
 - *Vessels with main engines with shaft power not exceeding 410 kilowatts or 550 horse power*
 - *A method of no more than 4 main nets and one try net towed at the same time*
 - *A method whereby the aggregate head rope (with mesh attached) for the main nets not exceeding 60 meters and one try net not exceeding 6 meters heal line*

- *A method whereby the meshes for all nets, when measured diagonally stretched from knots to knots are less than 50 mm both on the body and cod end*
 - *A method using an otter board that is more than 5 square meters in area, per board*
 - *Beam trawl of greater than 6 meters beam length*
- v) *By-catch reduction measures*
- *The legislation of Turtle Excluding Device (TED) and By-catch Reduction Device (BRD) for use by all licensed prawn vessels operating in the Gulf of Papua Prawn Fishery (GOPPF)*
- vi) *Other*
- *For small-scale fishery employing beam trawl towed by dory or dinghy, the taking of penaeid prawns is prohibited at all times;*
 - *By method where the width of all beam trawls exceeds 4 meters*
 - *By methods whereby the meshes of all nets when measured from knots to knots are less than 50mm (2.0 inches)*
 - *By method of beam trawl that does not incorporate a fish escape panel at the neck of the cod-end, consisting of 1 meter wide panel of net of 50mm (2.0 inches) mesh laid crosswise and which forms the body of the net at the neck of cod-end.*
 - *Compliance with regulations*
 - i) *A review of MCS systems in place for trawl fisheries including use of VMS for monitoring trawl vessels*
In accordance with Section of 29 of the Fisheries Management Act 1998, licensed operators are required to submit catch and effort data, as well as marketing data for the purpose of the fishery plan.
 - ii) *A scientific observer/research program mutually agreed to by the industry and NFA may be set up to monitor the fishery and to make recommendations for any relevant changes for improvement of the fishery plan to achieve logistic support and other form of assistance to implement the research program in relation to prawns as well as other alternate resources in the GOP.*
 - iii) *If there are indications of low recruitment through monitoring of reference limits, the National Fisheries Authority shall convene a consultative meeting with the industry to determine control management measures to control effort.*
 - iv) *The monitoring reference point are;*

- *That the catch per unit effort (CPUE) for the banana prawn shall be a 7.0 kg/hr*
 - *That the species composition of the banana prawn shall not be less than 45 percent of the commercial catches by weight*
 - *That the size composition of commercial grades of 51, 61 and 71 of banana prawn shall not exceed 25 percent of the catches by weight.*
- **Level of compliance with regulations**
 - *As a license condition, all prawn vessels licensed to fish in the GOPPF are installed with the Vessel Monitoring System (VMS) to regulate their movement. Therefore, the level of compliance in the prawn fishery is very high.*
- viii) Problems encountered with regard to by-catch/discards and management of concerned fleets (as defined in Scope of project above – elaboration of Problem statement in Section 1)**
- **Problems encountered with respect to by-catch and discards**
 - i) **Capture of juveniles (name of species and amounts), larger species (including turtles, sharks and rays)**

Table 3. Names of finfish and non-fish by-catch and their estimated quantities in percentage

<i>Common name of finfish & other marine spp</i>	<i>Family name</i>	<i>Estimated Amounts/ Quantities (%)</i>
<i>Batfishes (Platax spp)</i>	<i>Epphidae</i>	<i>2</i>
<i>Bullseyes, bigeyes, glasseyes</i>	<i>Priacanthidae</i>	<i>2</i>
<i>Crestfish, oarfish, dealfish, ribbon fish</i>	<i>Regalecidae</i>	<i>2</i>
<i>Goatfish</i>	<i>Mullidae</i>	<i>4</i>
<i>Groupers nei (Epinephelus spp)</i>	<i>Serranidae</i>	<i>1</i>
<i>Mackrels nei</i>	<i>Scombridae</i>	<i>2</i>
<i>Black pomfret such as Parastromateus niger</i>	<i>Carangidae</i>	<i>1</i>
<i>Porcupine/pineapple fishes</i>	<i>Diodontidae</i>	<i>2</i>

<i>Seaperches, snappers, sweetlips, red emperor</i>	<i>Lutjanidae</i>	7
<i>Sharks</i>	<i>Carachidae</i>	2
<i>Sea snake</i>	<i>Hydrophiidae</i>	2
<i>Sting rays</i>	<i>Batoidea</i>	2
<i>Jewfish</i>	<i>Sciaenidae</i>	3
<i>Anchovies (Thryssa)</i>	<i>Engraulidae</i>	10
<i>Ponyfish</i>	<i>Leiognathidae</i>	15
<i>Hairtails</i>	<i>Trichiuridae</i>	2
<i>Grunters</i>	<i>Theraponidae</i>	3
<i>Catfish</i>	<i>Arridae</i>	3
<i>Tongue soles</i>	<i>Cynoglossidae</i>	2
<i>Pufferfish</i>	<i>Tetraodontidae</i>	1
<i>Threadfin salmon</i>	<i>Polynemidae</i>	2
<i>Lizardfish</i>	<i>Synodontidae</i>	2
<i>Butterfly bream</i>	<i>Nemipteridae</i>	2
<i>Trevallies</i>	<i>Carangidae</i>	2
<i>Sardines/Herrings</i>	<i>Clupeidae (usually dominant fish families)</i>	20
<i>Slipper lobsters or bugs (Thenus spp)</i>	<i>Scyllaridae</i>	1
<i>Tropical or saucer bugs (Amusium spp)</i>	<i>Pectinidae</i>	1
<i>Squid</i>	<i>Architeuthidae</i>	2

ii) Interactions of coastal trawl fisheries with other ecosystem components: with prohibited, protected and threatened species and with vulnerable bottom habitat.

?

- Conflicts between different fleet segments, fisheries and other resource users
 - i) Review of specific situations where conflicts occur between different resource users and stakeholder groups.
 - *There were situations where resource owners taking hold of company vessels and demanding the company and Government to pay them compensation for the use of their resources.*

- *There were situations where resource owners and resource users having conflict over the ownership of by-catch.*

ii) Nature of conflict

- *The resource owners are not getting by-catch as per their request from prawn vessels.*
- *Resource owners are not paid compensation or royalty payments for use of their resources.*

iii) How the conflict is addressed

- *The resource users making arrangements with resource owners to sell them by-catch for K2.00 per kilo instead of giving them free*
- *The resource owners requesting the company through a formal letter to the Managing Director of the company to give them the by-catch*
- *The resource users avoid fishing the conflict area completely.*

- Other problems related to fisheries management, e.g., with regard to:

i) Economic and/ or biological over-fishing

ii) Fleet capacity and fishing effort

- *The GOOPF is allocated with 15 vessels. Currently, only 13 vessels are actively fishing for prawns, with one decommissioned and the other sold out.*
- *The fishing effort for the last 10 years (2000-2009) has declined due to lesser number of vessels not fishing consistently throughout the year because of the aging and their continuous break down (Fig.2).*

iii) MCS/enforcement

- *Illegal fishing inside the 3-mile was a problem in the past, until the introduction of the VMS when it's no longer a management problem.*
- *Taking of lobsters, shark-fins and turtles is currently a management problem.*

iv) Other

- Importance of by-catch from a socio-economic point of view that could constitute a disincentive for reducing by-catch

- i) Income for fishers and post-harvest handlers
- ii) Demand from aquaculture

With the increase in aquaculture development project in the country, there is going to be greater demand for by-catch as feed fish.

- iii) Role of trash fish/low value fish in food consumption

The trash fish/low value fish constitute an important part of the people's diet, especially in supplementing the protein deficiency diets of the people.

- Other barriers to achievement of sustainable fisheries and conservation (ecologically/ biologically and /or socio-economic not mentioned above)

SECTION 3: KEY ACTIVITIES, STRUCTURES AND PERCEPTIONS

I. Activities and programs in support of by-catch management and sustainable fisheries (with regard to fishing or post-harvest/marketing activities):

1. Description of current and planned activities

- Government activities

Nil?

- Donor funded project and activities

The Turtle Excluding Device (TED) project funded by University of Hawaii for the Gulf of Papua Prawn Fishery

- Other activities carried out (by NGOs or other organizations)

Nil ?

2. Planning and implementation processes

- Which directorates are engaged in planning management measures?

The Fisheries Management Unit of the National Fisheries Authority

- What is the planning process for investigating and implementing management measures?

- What level of private sector participation is being planned?

3. Earlier activities and research conducted to minimize impacts of fishing

- Reviews of by-catch and discards studies and list of references

- *ACIAR Project*
 - Reviews of technologies introduced to reduce by-catch and discards
Nil ?
 - Reviews of by-catch post-harvest utilization, product/marketing improvements and demand analyses
 - Review of success/failure with by-catch management and discard reduction measures
Nil ?
 - Reviews of studies of the impact of trawling on seabed habitats
Nil ?
 - Reviews of studies of the techno-economic impacts of changes in management measures to the commercial fleet
- II. What is the relationship between fishermen and researchers/managers regarding by-catch management and reduction of discards:
1. Private sector adoption of by-catch management technologies
 - *Turtle Excluding Devices (TEDs) was introduced into the GOPPF by NFA and the technology was well received and adopted for use, but is yet to be fully implemented.*
 2. Private sector participation in by-catch projects
 - *The private sector has fully participated in the TED project and is now showing keen interest to participate in the current by-catch project.*
 3. Private sector perspective of by-catch management and discard reduction
 - *The private sector consider by-catch management and discard reduction as a step forward in terms of economic gain through improvements in prawn quality at the same time allowing juvenile fin-fish of economic importance to grow to valuable size before harvesting.*
 4. Public awareness of by-catch management and discards reduction
 - *An awareness of the by-catch management and discard reduction project has already been made to various stakeholders (such as the resource owners, Local Level Government (LLG), Provincial Government, Department of Environment and Conservation, Nature Conservancy, and the Department of Agriculture and Livestock) during a recent prawn consultative meeting held in Port Moresby PNG.*

III. Market drivers

1. Market/value-chain structure for catch and by-catch products from the concerned trawl fleets(s) (processors, traders, companies, domestic and export markets)

- *Small by-catch fin-fish of valuable sizes are put in trays, frozen in ice and taken to port for sale in markets, retail shops and super-markets at prices ranging from K3-5 per kilo of block fish.*
- *Large fin-fish species are normally frozen whole with some filleted and sold at prices ranging from K5-7 per kilo and K10-12 per kilo respectively at local and super-markets.*
- *Only a small portion of by-catch are filleted and exported overseas.*

2. Existing eco-labeling and or certification schemes

- For marine products – domestic or export markets
 - *Eco-labeling is not used at the moment, because of the non use of TEDs and BRDs. What the company promote under this label or emphasis on their package is the ‘wild’ or natural prawns caught as compared to cultured prawns. The raw marine products are packed for both domestic/export with same labeling. The certification scheme involves the uses of HACCP, generally done to export prawn products to European markets.*
- For other food products – domestic or export markets

3. Existing or likely future price premiums for “eco-friendly” products

United State and European markets have premium prices for product with stringent eco-labeling conditions.

4. Domestic consumers perception of “eco-friendly” products (awareness of the concept)

Domestic consumer may be aware or ignorant to this concept (eco-friendly) but will buy into any seafood products that are cheap and have constant supply.

SECTION 4: PROJECT FORMULATION

I. What is the expected impact of the project?

1. On fish catches – changes in volume and value of landed catches

Around 50-60 percent volume of fin-fish by-catch will be reduced. Similarly, the volume of by-catch landed will be reduced thus resulting in lesser economic gain from companies.

2. On discards – changes in volume of discards

The volume of discards will decline

3. On fishing capacity, employment and income of fishers in the concerned fleet segment(s)

The fishing capacity will improve with lesser number of employees thus saving costs of operation and increasing the fisher's income.

4. On post-harvest sector – volumes and values treated, employment

The volume of by-catch processed will be drastically reduced therefore will require less number of people, thereby reducing employment.

5. Fish (by-catch) consumption

The volume of by-catch (commercially valuable fin-fish) sold to people for consumption will be drastically reduced.

6. Inputs into other economic activities (aquaculture)

There will be less input of by-catch into other economic activities (such as the aquaculture sector).

7. Conflicts (between resource users and/or other stakeholders)

No conflicts will arise between resource users and stakeholders, but there may arise some conflicts between resource owners and users in terms of resource utilization by resource owners (especially from not getting the expected amount of by-catch).

8. Relevant marine habitats

The marine habitat will increase its yields (in terms of fin-fish and non-fin-fish production), thus replenishing the whole marine ecosystem.

9. Legal and institutional structures – government, private sector, social society

10. Regional cooperation on by-catch management

11. Awareness raising

12. Other

II. Who are the beneficiaries and stakeholders?

1. Direct and indirect beneficiaries

- *The direct beneficiaries will be the prawn operators*
- *The indirect beneficiaries will include resource owners, National Fisheries Authority, Non-Government Organizations and the Provincial Government.*

2. Stakeholder analysis

III. What are the expected outcomes?

- *More than 50 percent of finfish and non-fish by-catch will be reduced.*
- *Long-lived and short-lived species, including non finfish species will increase in population.*
- *Resource users will acquire greater economic benefits, in terms of improvement in the quality of prawns and the capturing of large valuable fin-fish for commercial exportation and domestic use.*
- *The protection and conservation of species bio-diversity on a national, regional and global level.*
- *By-catch data and information (not currently available) will be acquired to use in planning, management and developing strategies for by-catch management plan.*

IV What are the outputs?

- *The By-catch Reduction Device (BRDs) will be tested in parallel with looking into gear modifications that could reduce fuel consumption - the profitability of the prawn fishery is a concern and the industry would be interested in reducing fuel consumption.*
- *The re-introduction of Turtle Excluding Device (TEDs). This work was done but was never finalized. Additional efforts will be needed if the device is going to be applied.*

V What are the main activities?

- *Collection of biological and socio-economic data/information to define the strategies for by-catch management plan, and this will include by-catch composition, volumes, values and utilization. These data will be needed to evaluate the possible impact on the fishery resources, livelihood and security.*

VI. Monitoring and evaluation – what would be good SMART indicators?

VII. What are the implementation and management arrangements?

- Consultations and collaboration arrangement with private sector and stakeholders
- National project management arrangements

VIII Risks:

- What are the main risks for not achieving the outputs and outcomes?
 - *Loss to economic value*

- *Loss to species bio-diversity*
- *Loss to long lived fish species resulting in increased population of short-lived small fish species.*
- Are there potential undesirable effects?
 - ?

IX Project budget: *see also attached sample spread sheet*

ANNEXES (including but not limited to):

- Catch statistics (volumes and values) and effort data for commercial trawl fishery (ies)
 - *Catch and effort data provided*
- Additional socio-economic data and studies of trawl fisheries (catch values, income, employment, catch utilization, trade, consumption, etc)
- Maps of fishing grounds, seabed habitats and major fishing ports
 - *Map of GOPPF provided*
- Diagrams of fishing gears and arrangements used in the fishery
 - *Diagrams will be provided later*
- Photos of vessels and fishing gear used in trawl fisheries
 - *Photos will be provided later*
- Copies of current fisheries legislation and policy documents as described under.
 - *Copies of prawn management plan*