

Biology and status of the prawn stocks and trawl fishery in the Gulf of Papua (FIS/2002/056)

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Project number	FIS/2002/056
Project name	Biology and status of the prawn stocks and trawl fishery in the Gulf of Papua
Collaborating institutions	Australia: Commonwealth Scientific and Industrial Research Organisation (CSIRO) Marine and Atmospheric Research; University of Tasmania Papua New Guinea: Papua New Guinea National Fisheries Authority (NFA)
Project leaders	Australia: Dr David Milton Papua New Guinea: Mr Augustine Mobiha
Duration of project	1 July 2003 – 31 December 2006
Funding	Total A\$ 849,051 (ACIAR contribution: A\$479,679)
Countries	Papua New Guinea, Australia
Commodities	Prawns and other fishes
Related projects	FIS/1996/081, ASEM/2002/050

Motivation for the project and what it aimed to achieve



The Gulf of Papua (GOP) prawn fishery is one of the most valuable fisheries in Papua New Guinea (PNG). Catches have fluctuated widely and there has been limited success in assessing sustainable yields. The trends in catches and catch rates in the fishery were declining in the early 2000s. To maintain their economic viability, fishers were increasing their illegal trawling inshore within the 3 nautical mile (5.6 km) traditional fishery zone. In the late 1990s, irate villagers took the situation into their own hands and boarded vessels illegally fishing within the traditional fishery zone and confiscated their catch. Fishery-independent surveys were needed so the PNG NFA could understand the reasons behind this conflict and the effect of this illegal fishing on the prawn stocks.

The previous GOP prawn fishery management plan was gazetted in 1997. It advocated the development of a 20-vessel inshore fishery for traditional owners. Eager provincial politicians were beginning to actively canvass for funding for such a fishery in the early 2000s. Scientists at NFA were concerned about the potential for this fishery to catch recruits of the offshore commercial fishery and thus lead to overfishing of the prawn populations. In order to assess these concerns and establish the effect of any new inshore fishery on the existing commercial fishery, a detailed analysis of existing commercial logbook catch data was needed, along with fishery-independent surveys to map the distribution and abundance of adult and juvenile prawns in the GOP.

Outputs—what the project produced



Technical outputs

There were several technical outputs from the project:

- demonstration that the densities of immature and adult prawns were 30% higher within the 3 nautical mile traditional fishery zone, and that about one-third of the prawn catch has come from that zone since the fishery began
- access to the 3 nautical mile traditional fishery zone by the industrial fishery will not increase the risk of overfishing if the total catch remains below 480 tonnes of banana prawns
- the prawn species composition within the fishing grounds was strongly structured in relation to terrestrial run-off and bottom sediment type
- immature prawns are recruited to the fishery throughout the year, form a substantial component of the catch and are impossible to avoid, but the economic return from the fishery could increase if fishing within the 3 nautical mile traditional fishery zone occurred after midyear (July), as fewer immature prawns are present then
- the maximum biological yield of the two target species in the fishery was estimated to be 480 tonnes of banana prawns and 110 tonnes of black tiger prawns.



Lunchtime for the project team during the annual project coordination meeting in October 2004, which was held at Loloata Dive Resort off Port Moresby, Papua New Guinea. (Photo: D. Milton)

Policy outputs

The main planned policy outputs from the project were:

- recommendations to NFA on new management measures to improve the economic and biological sustainability of the industrial prawn trawl fishery. These recommendations have all been incorporated in a new GOP prawn fishery management plan that was gazetted in 2008.
- advice on the feasibility and viability of an inshore small-vessel fishery operated by the traditional resource owners. This fishery was not considered feasible due to the rough weather in the region and the relatively high cost of entry. Alternative access arrangements were proposed whereby industrial vessels fished within the traditional fisheries zone after negotiating an acceptable access fee. These arrangements have been included in the new management plan, but have not been taken up by the fishery to date.
- a mechanism for NFA to set the total allowable catch from the fishery and to adjust it based on the catch of the previous year.

Capacity building

The capacity of fisheries management and data management staff within NFA was greatly enhanced through their involvement in the project. The NFA fishery managers now have the capacity to plan, organise and undertake fishery-independent surveys in any fishery. NFA has undertaken two fishery-independent surveys in the GOP prawn fishery since the project was completed. One of the staff employed on the project has now become a manager of sedentary fisheries and undertakes similar surveys for bêche-de-mer (sea cucumber).

Data-checking and quality-assurance routines developed by the project are still being used in the entry of the GOP prawn fishery logbook data. Licensing staff have expanded their use of these approaches to their management of data from several other marine fisheries in PNG. The logbook database is being maintained and kept up-to-date by entry staff through processes developed during the project. NFA has the capacity to implement the total allowable catch estimation if required.

Adoption—how the project outputs are being used



The main technical and policy outputs from the project have been used to develop a new GOP prawn fishery management plan. This plan was gazetted in late 2008 and includes all the major recommendations from the project. The new plan has made several changes to the management regulations of the fishery from the previous plan of 1997. The old plan had recommended 15 fishing licences. This has been reduced to 10, to maximise the economic yield from the fishery. These licences will now be valid for 5 years, which is a substantial increase from the annual licence that was available under the previous plan. This change was intended to increase the value of the licence and thus allow operators to borrow funds against this value and upgrade fishing vessels under more favourable financial terms. Access to the 3 nautical mile traditional fishery zone is no longer illegal under the new plan if operators negotiate an access agreement with the traditional resource owners. This change is intended to (a) legalise access for the industrial fishery to the more productive inshore waters and (b) provide some income for remote coastal communities from the trawling that has occurred in their waters.

Since the project, the costs of fishing have continued to increase and prawn prices have remained stable. This has forced the least efficient operators out of the fishery as their economic return declined. In 2011, the fishery still has 15 licences, but only six vessels are actively fishing. The fees for the remaining licences have



Mr Barre Kare, Prawn Fisheries Manager, National Fisheries Authority of Papua New Guinea, with several red snapper caught during a fishery-independent prawn trawl survey in the Gulf of Papua, Papua New Guinea. (Photo: D. Milton)



Mr Barre Kare and Ms Luanah Yaman from the National Fisheries Authority of Papua New Guinea surveying a typical prawn trawl catch with one of the fishing crew during the fishery-independent prawn trawl survey in the Gulf of Papua in 2005. (Photo: D. Milton)

been paid but the vessels have remained in port. Thus, although the reduction in licences outlined in the new management plan has not been implemented, the economics of the fishery has had the desired effect of reducing effective fishing effort. It also has meant that the active fishers have had higher catch rates and their profitability has increased. Two new vessels have been purchased by a new company that entered the fishery in 2009 and these are proving much more reliable and effective than the other, older vessels.

Impact—the difference the project has made or is expected to make



The main direct impacts of the project have been in the changes in the management structure of the fishery (through its management plan) to improve its economic and biological sustainability. These changes have not all been completely implemented, and the economic environment of the fishery has also remained subdued. These external factors have a strong influence on incentives to adopt the outputs fully. This is particularly true of the negotiated access provisions in the new management plan. These provisions have the ability to generate an economic return to coastal communities from their traditional resources extracted by the industrial fishery. Rather than being a source of tension between coastal communities and the fishing industry, these access agreements can facilitate and improve the economic returns to the industry by increasing access to the larger prawn resources inside the 3 nautical mile traditional fishery zone. However, the industry is wary of entering any agreements, due to the unrealistic expectations of the coastal communities involved. The likely financial returns may not be sufficient to cover the access fees demanded. The fishing fleet of six vessels currently active probably has high catch rates without the additional expense (risk) of negotiating access to the inshore zones. Thus, the current economic environment is constraining the fishery and stopping the community from gaining any income from the



Ms Luanah Yaman from the National Fisheries Authority of Papua New Guinea showing the bottom fishing gear on the prawn trawl net used during a project fishery-independent survey in 2005. (Photo: D. Milton)

exploitation of their prawn resources. The price for prawns would appear to need to increase substantially before there was sufficient incentive for additional investment in the fishery and negotiation of an access agreement.

The most effective adoption of outputs from the project has been within the management of the fishery by NFA. The changes made to the prawn fishery daily logbook entry system and the quality-control checks implemented by the project have been very successful. These are major advances from the data system in place at the inception of the project. At that time, the method of entering the logbook catch data was so detailed and complex that the entry staff could not keep up with the rate of logbook submissions. The project was instrumental in streamlining the entry forms to allow processing of the critical data for population assessment in a timely manner. The quality of these data has also been greatly enhanced through the provision of new data check systems that have dramatically reduced the number of errors in the logbooks. Furthermore, the new systems have led to improved liaison between the licensing section in NFA and the fishing companies. Logbook returns being completed by fishing skippers have much fewer errors, and specific concerns or inconsistencies can be readily dealt with in a very short time.