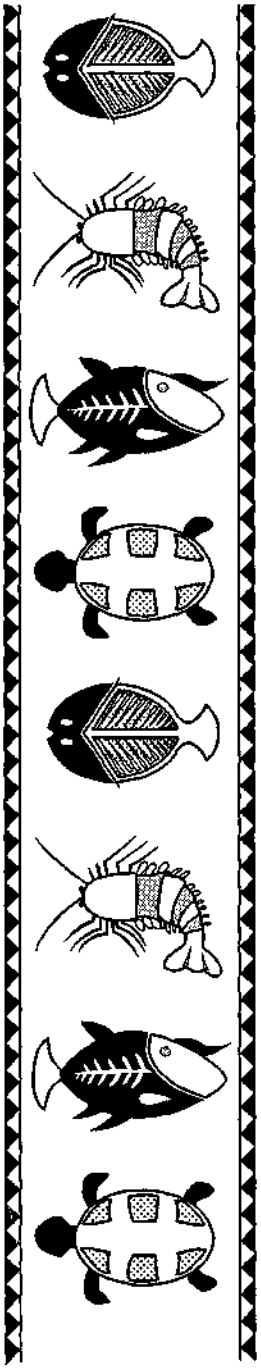


Inshore Fisheries Research Project
Country Assignment Report

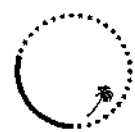
THE STATUS OF STATISTICAL REPORTING FROM ARTISANAL FISHERIES IN VANUATU

South Pacific Commission
Noumea, New Caledonia

The status of statistical reporting from artisanal fisheries in Vanuatu

by

P. Dalzell
Inshore Fisheries Scientist
Inshore Fisheries Research Project
November 1992



South Pacific Commission
Noumea, New Caledonia

EXECUTIVE SUMMARY

1. A review was made of the fisheries statistical data collection in Vanuatu and how this data is being used. This review concentrated mainly on the collection of data from deep slope or demersal fisheries in Vanuatu. Data collection programmes established by ORSTOM, the Fisheries Extension Centres and the Fisheries Training Centre are described in detail. Both the ORSTOM data and the information from the Fisheries Extension Centres are stored in computer database files for summary and retrieval. It is essential that the reporting programmes for these files are properly maintained to maintain a flow of information for managing Vanuatu's coastal fisheries.

2. The data collected by the Fisheries Training Centre are records of fishing trips made by staff and students of the centre around southern Espiritu Santo. These records represent an important time series of data on fishing conditions in one of Vanuatu's most important demersal fishing grounds. These data should be entered into database files for summarising and generation of a report on the catch composition and catch rates of the demersal stocks in south Santo. This area is also likely to become an important fishing site for coastal pelagic fisheries and so continued data collection from the Training Centres fishing activities will be important in establishing good quantitative data on pelagic catch rates, catch composition and seasonality of component stocks.

3. Presently, little use is being made of the large amount of fisheries statistical data being accumulated in computer files in the Fisheries Department. An analysis was made of the information contained on the receipts or 'goods received notes' (GRNs) from the six Extension Centres as an example of the type of useful information that can be generated from the fisheries databases. Comparisons were made between the catch volumes, catch rates and average size of fish landed at the six Centres. Catch rates ranged between 17.6 and 81.4 kg/trip (mean = 39.9 kg/trip) or 2.8 and 9.0 kg/trip-hr (mean = 6.0 kg/trip-hr). Catch rates appeared to be inversely proportional to fishing effort suggesting that some form of surplus production model might be used as a management tool to set maximum sustainable yield for different fishing grounds. The effects of fishing on virgin deep slope stocks at Pentecost were clear from the data where the average size of fish landed was 9.9 kg versus 1.5 to 2.7 kg (mean = 2.0 kg) from the other five Centres.

4. Analysis of the composition of landings at the Natai fish market in Port Vila demonstrated that the present system of recording fish sold to the market in inappropriate. The switch by fishermen to targeting for shallow reef fish is evident in the information but all reef fish are grouped into one miscellaneous category, 'other species'. Shallow-water reef fish now account for one third of landings but are undifferentiated in records. Species such as amberjack, mahimahi and yellowfin, which though important and much in demand in Vanuatu, are rarely landed at the Natai facility, but are still recorded separately in the Natai landings statistics. The shift in fishing activity has important management implications for Vanuatu's coastal fisheries. The continuation of emphasis on recording relatively unimportant species is highlights the need for better statistical monitoring and interpretation by the Fisheries Department.

5. Approaches to improving the reporting and interpretation of fisheries statistical data in Vanuatu are discussed. If the Fisheries Department's Research Branch (RAB) expands then at least one research officer should be given full-time responsibility for fisheries statistics. Given the inexperience of new RAB staff, should they be recruited, then a Research Advisor should be sought from outside Vanuatu to supervise and direct the RAB until the local staff have gained sufficient experience and skills to function without assistance. Such a Research Advisor should be a fisheries scientist with considerable experience with tropical fisheries and familiar with the conditions that prevail in developing economies such as Vanuatu.

6. A previous report on research activities in Vanuatu, by the same author is appended here for reference as it contains information relevant to the present study and also indicates some approaches that might be made to analysing and interpreting fisheries statistical data.

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INTRODUCTION

In common with other Pacific Island countries, the Government of Vanuatu has pursued a policy of developing small scale artisanal fisheries to improve the supply of fresh fish and to provide income earning opportunities at the village level. This policy has led to the development of an artisanal fishing industry that was initially based on the exploitation of deep slope fishes but is presently diversifying into catching large pelagic fishes and shallow water reef fish. Vanuatu also has a button and ornamental shell industry based chiefly on the harvests of the top shell *(Trochus niloticus)* and green snail *(Turbo marmoratus)*, that has grown from two processing plants in 1990 to eight in 1992. Finally, the islands of Vanuatu have large numbers of coconut crabs, which are harvested mainly for hotels and restaurants that serve the important tourism industry in Vanuatu.

These various fishing and harvesting activities generate large volumes of catch and fishing effort data, particularly on fin-fish production. This information, however, is not being processed in a timely manner and is not available for fisheries officers concerned with managing and developing coastal fisheries in Vanuatu. The collection of data, although in some cases well established and maintained, is not being critically reviewed in the light of changes in coastal fishing. Further, there is a need to improve the reporting of information on harvests of trochus and coconut crabs which at present is poorly understood but thought to be excessive.

The problems being faced by the Vanuatu Fisheries Department are common in the Pacific. The Resource Assessment Branch (RAB) is small and has relied on technical assistance for a number of years from the French overseas scientific organisation ORSTOM[1]. One ORSTOM staff member was attached to the Fisheries Department to provide information for the management of deep slope fisheries. Technical assistance for other resource management studies eg trochus, green snail, etc.was provided by the attachment of volunteers from the French organisation VSNA[2]. The ORSTOM technical position attached to fisheries is likely to be moved to another department in the future. The present staffing of the RAB is one biologist. Further, one technical staff member that worked in the RAB and who was responsible for the maintenance of computers and database management has left for employment elsewhere.

The Fisheries Department has submitted a plan for an expansion of the RAB but this is yet to be approved by the Vanuatu Government. The expansion of the RAB will include two new biological positions and technical staff, one of whom will be in charge of computers and database maintenance. The Department will also seek external funding for a research advisor to direct research activities and improve the level of skills within the RAB. In the interim, the Fisheries Department requested that South Pacific Commission Fisheries Programme review the present collection of fisheries statistical data and suggest ways in which the flow of information for extension and management can be improved. The request to the SPC also specified provision of the terms of reference for the research advisor.

Fisheries research and statistical data collection has been previously reviewed in Vanuatu by Wright (1989) and Dalzell (1990) (attached here as Appendix 3). This review concentrates principally on the various fisheries statistical data collection programmes in Vanuatu and discusses how these can be improved. In order to demonstrate the value of the present fisheries data collection, some analyses are also made of one of the data currently generated from the fisheries Extension Centres in Vanuatu. Finally, the terms of reference are given for a Fisheries Research Adviser to be appointed to develop more effective fisheries data collection and dissemination in the Department's Resource Assessment Branch.

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1. ORSTOM = Institut Francais de Recherche Scienlifjque poor le developement en Cooperation

2. VSNA = Volontaire du Service National Actif

FISHERIES DATA COLLECTION

Information on fish catches in Vanuatu comes from three sources. The oldest of these is the catch record system established by ORSTOM, principally for monitoring the dynamics of the deep slope fishery. Deep slope fisheries resources in Vanuatu began to be seriously exploited after 1982 when the Village Fisheries Development Project (VFDP) was established. The VFDP provided assistance to ni-Vanuatu villagers who wished to fish on deep slope fish stocks, but lacked the available capital for a vessel and gear, and the expertise to catch, preserve and market deep slope fishes. Coincident with the development and extension of deep slope fishing was a catch data recording system designed to monitor the progress of the fishery.

From 1982 to early 1987, village fishing projects were obliged to keep a daily record of each fishing trip in order to qualify for purchasing duty free fuel. The data collected on these form as specified total catch, duration of fishing trip, fish sales and expenses incurred for the particular trip. Over 11,000 fishing trips were recorded in this manner between 1982 and 1987. Trip record forms were also available from ORSTOM and a reward of 50 vatu was provided for completed daily trip forms as an incentive for the fishermen. This programme started in mid-1983 and recorded information on location of fishing area, fishing depth in metres, catch by gear type, duration of fishing trip and measurement of all fish belonging to the eleven major species in the catch. A total of 2391 trip records were compiled on this form and a total of 30,616 individual fish were measured.

In 1987 the trip record forms of the Fisheries Department and ORSTOM were merged to avoid conflict of information and misreporting. The new form permitted the fishermen to but duty free fuel and ORSTOM maintained the incentive payment of SO vatu. As in the past the new form was produced in Bislama (Appendix 1) and consists of a series of questions designed to solicit information on catch, fishing effort, income and expenditures. Collection of data throughout this form has been maintained from 1987 to the present.

No direct record was made of the species composition on the merged form or on its predecessors. Instead, the lengths of the eleven common species could be used to compute weights from length-weight relationships, and thus express these as a percentage of the total reported weight. The numbers of fish in the catch are not recorded. The numbers of the eleven commonest fish in the catch can be obtained from the length observations but these can not be expressed as percent composition in the same manner as weight.

Although the ORSTOM-VFDP form has served a useful role in monitoring the deep slope fishery and estimating MSY, it was not designed to provide the type of information for fisheries extension and development officers. This problem was addressed in 1989 and 1990 by the introduction of a new data collection system operated by fisheries Extension Centresand the two main fish markets in Vanuatu (Natai in Port Vila and Santofish in Luganville). This system, the goods received note (GRN) is essentially a receipt for fish purchased from fishermen Appendix (1). The data collected from the GRNs falls in to two categories, that collected from fisheries Extension Centres and that from the two fish markets

The receipt used at fisheries Extension Centres records details of the trip length (in hours) and composition of the catch. The catch composition is given in numbers, weight and value and contains 13 bottom fish species, 4 large pelagic species, 3 coastal small pelagic species and mixed reef fish. Fishermen reporting their catch to Extension Centres and the fish markets are then eligible for duty free fuel. Some fishermen do not wish to sell through the government institutions but do want the duty free fuel. They can become eligible for the cheap fuel by filling in GRNs themselves when they return from fishing trips.

The GRN from Natai and Santofish is simpler and contains no record of fishing effort or catch composition (Appendix 1). Catch composition is, however, usually recorded, based on the price listing

used at these markets. Hence all eteline snappers are listed as 'poulet fish', groupers as lôche, lutjanine snappers 'snappers' or 'sea perch' etc. Reef fish are usually grouped as mixed reef fish or in some instances parrotfish are distinguished as 'blue fish'.

A fourth data source that is implicit in the records of catches from the Santo are the catch records made by the Fisheries Training Centre (FTC) in Santo (Appendix 1). The training centre was established to support Vanuatu's developing small scale fishing industry by providing villagers wanting to become fishermen with the necessary skills to maintain and run a small scale fishing operation. The training courses include many hours spent fishing which generates a substantial fish catch. This is sold to Santofish and accounts for up to half the annual volume of fish processed through this market.

The data collected by the FTC is similar to the information on the ORSTOM form and records in detail the catch, fishing effort and catch composition, and the value of the catch. However, most of the fishing data is concerned with catches from the south coast of Santo. In the future, catches from the FTC will likely contain greater volumes of pelagic fish caught around FADs deployed off the south Santo coast. Besides the training imparted to the fishermen, the reason for targeting on large pelagics is to generate income for the FTC as Government funds will not be sufficient.

The ORSTOM data and the GRN data from the Extension Centres and the two fish markets are entered into computer files using DBASE 4. Three databases have been constructed to file and summarise the data. Data entry is now a familiar routine in the Department and presents no problems to the staff. Unfortunately, DBase programmes require that report sub-programmes be written to summarise the data in a given manner and print it out. The report programmes for the three databases are incomplete and only one (for the extension centre GRN data) is working well enough to produce useful summaries (see further below).

Little use is made of the data collected on fin-fish production in Vanuatu to produce reports and management advice. The last document on deep slope fish production produced by Department was the paper in 1989 resulting from the USAID-NMFS workshop on tropical deep slope fisheries in Hawaii (Carlot & Cillauren 1990). Previous reports on the deep slope fisheries resources in Vanuatu include Brouard & Grandperrin (1983), Schaan et al (1987) and Carlot & Nguyen (1989). All of these papers are concerned with aspects of stock assessment of the deep slope resources based on historical data and do not reflect the present nature of the fishery that is based around the Extension Centres and the Natai fishmarkets.

Subsistence fisheries production can be estimated from the smallholder agricultural survey, conducted in 1990 (Anon 1991). According to the survey about 70 % of the population fish in any one week, with an average of three fish meals per week. Assuming an average portion size of 150 g and using a 1990 population estimate of 146,400, then the total subsistence fisheries production is estimated at 2,295 t. A further 353 t of shellfish can be added to this based on similar data for the 30 % of the population consuming shellfish in any one week, with an average of three meals a week and a portion size of 50 g.

Little information is available on the recent harvests of trochus and other similar molluscs. Prior to the expansion of the button and ornamental shell industry since 1990, the annual harvest of trochus and other shells amounted to less than 100 t/yr. The button factories are not permitted to export whole shells and the only information that is available are the records of the exports of button blanks from the Vanutau Customs Office. There is presently no information being collected from the on the levels of harvesting and on the size frequencies of the shells collected from the different islands.

Most coconut crab is sent to the main island of Efate for the tourist industry, however, there is again little to no information on the volume of production. Since all crab shipments are made by air it might be possible to determine these through checking the Van Air freight records. Concern at the levels of harvest have caused a moratorium on sales of coconut crabs during the breeding season.

ANALYSIS OF EXTENSION CENTRES AND NATAI FISH MARKET DATA.

Extension Centres

For the purposes of this report, the data from the six Extension Centres (Lakatoro, Lamen Bay, Lolowai, Pentecost, Sola and Tongoa), collected between 1990 and 1991, was summarised from the GRN database. This represents over 1000 fishing trips generating a catch of about 32 tonnes of fish worth 5,230,833 vatu. Most of the landings at the six Extension Centres are thought to be fish caught on the deep reef slope since high value large pelagic fishes such as mahi-mahi and yellowfin tuna are usually marketed privately.

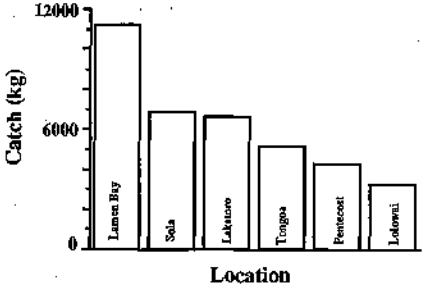

Figure 1. Landings of fish at six extension centres in Vanuatu, 1990-1991

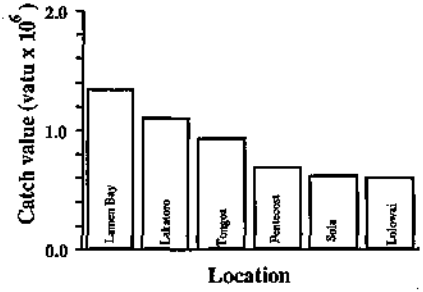

Figure2. Value of fish landings at six extension centres in Vanuatu, 1990-1991

The Extension Centres are shown ranked by the total landings over the two year period in Figure 1. The greatest volume of fish. 11.3 t, was landed at Lamen Bay and the least at Lolowai. Lamen Bay and Lolowai had the respective maximum and minimum values of the catch (Figure 2), as might be expected, however, the ranking order by value of the other four Extension Centres was not the same as for volume of landings. This is due to a combination of the various prices paid for different fishes and the spoilage and disposal of fishes that were not sold.

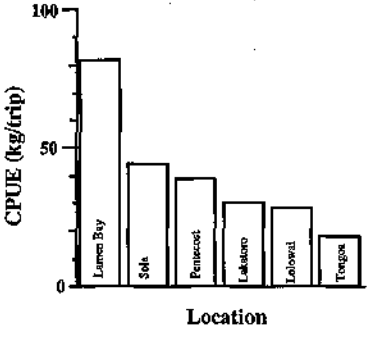

Figure 3. Average CPUE in kg/trip for six extension centres in Vanuatu, 1990—1991

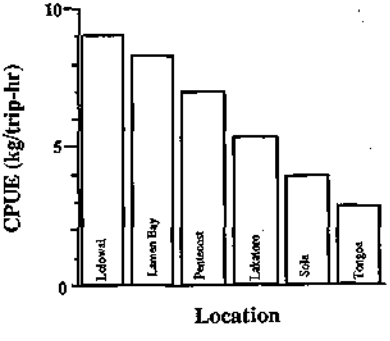

Figure 4. Average CPUE in kg/trip-hr for six extension centres in Vanuatu, 1990—1991

The catch per unit effort (CPUE) for fishes landed into the Extension Centres can be expressed as kg per trip or as kg per trip-hour. The average CPUE expressed per trip and trip-hour for fishermen landing into the six Extension Centres is shown in Figures 3 and 4. Catch rates ranged between 17.6 and 81.4 kg/trip (mean = 39.9 kg/trip) or 2.8 and 9.0 kg/trip-hr (mean = 6.0 kg/trip-hr). The ranked order of average CPUE on a per trip basis is quite different from the ranked order of the CPUE expressed per trip hour. The greatest volume of fish per trip is landed at Lamen Bay, but the greatest hourly catch rates are experienced by fishermen landing at Lolowai.

It is difficult to comment on these data without making corroborating observations in the field. The main criticism of both expressions of fishing effort is that they are too crude and do not take into account numbers of fishing gears or the types of gears used. Trip length is likely to vary between the different locations and will be a factor of distance from the fishing grounds, Type of fishing (ie trolling or bottomfishing) and possibly social factors such as the need for cash to meet eduction fees or other responsibilities.

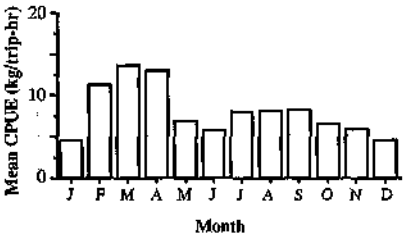

Figure 5. Average monthly CPUE for six extension centers in Vanuatu, 1990—1991

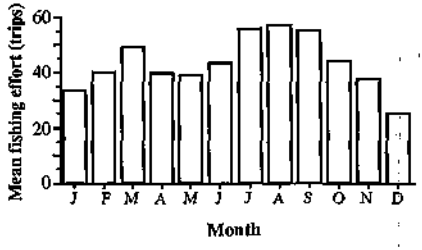

Figure 6. Average monthly fishing effort for six extension centers in Vanuatu, 1990—1991

The CPUE values for each extension centre were averaged over the months of the calendar year then smoothed with a running average of three (Figure 5). There is a clear peak in the average CPUE between February and April, followed by a smaller less obvious peak between July to September. The periods between these two peaks in CPUE are 5 and 7 months, which may reflect biological and behaviourial responses of the fish to climate driven seasonal environmental changes leading to increased catchability in March and August. The seasonal variation in the monthly frequency of fishing trips for 1990 and 1991 was also very similar to the variation in CPUE (Figure 6) and may reflect the greater incentive for the fishermen to go fishing during periods of increased catch rates.

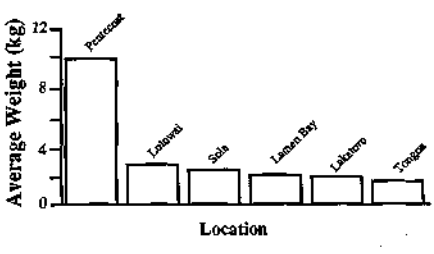

Figure 7. Average weight of fish landed at six extension centers in Vanuatu, 1990—1991

The average weights of the fishes landed at the six Extension Centres are shown in Figure 7. The average weight of fish landed at Pentecost was 9.9 kg versus 1.5 to 2.7 kg (mean = 2.0 kg) from the other five Centres. The fish landings at Pentecost are from fishing grounds that have only been exploited relatively recently and thus the larger individuals that are normally removed from the population through persistent fishing are still being captured at Pentecost. It would be interesting to analyse this data further when species composition data can be extracted from the GRN database.

The fishing effort for landings at the GRN can be expressed as number of trips or total trip hours. Trip hours are not always reported by the fishermen, although trip hours is probably a better expression of fishing effort than simply trips. However, the average trip length could be computed from the GRN data and then multiplied by total number of trips to obtain fishing effort. The total catch between 1990 and 1991 for each of the six Extension Centres is shown plotted against the corresponding total effort in Figure 8 and the CPUE versus effort in Figure 9. The data suggest that CPUE declines with effort and that relationship between catch and fishing effort might be explained by a simple surplus production model.

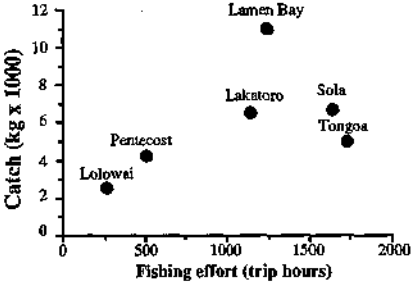

Figure 8. Catch versus fishing effort for six extension centers in Vanuatu, 1990—1991

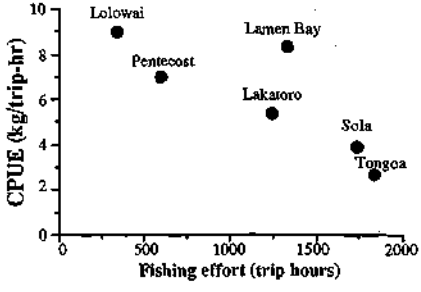

Figure 9. CPUE versus fishing effort for six extension centers in Vanuatu, 1990—1991

This analysis is not taken any further here since the catch and fishing effort are expressed as simple totals and not as functions of the area fished. Further, the catch data refer to a multispecies complex and not to a single species. Conventional production models describe changes in catch in response to changes in fishing effort at one location over time. These data refer to six different locations fished over the same time period. Such an approach has been used by other workers (Munro & Williams 1985; Lock 1986) in the absence of long time series of data on catches.

Natai Fish Market

The composition of landings to the Natai fish market in Vila between January and September 1991 is shown in Figure 10. The dominant feature of the catch is poulet fish or eteline snappers, which account for about half of all landings. The eleven other species that are recorded in the catch such as amberjack and bream, comprise about 13 per cent of landings.

The 'other species' category of fish are mainly shallow water reef fishes which have been increasingly targeted for commercial catches and now account for about 34 % of fish sold through the Natai market in Port Vila. However, little is known about the true composition of these reef fish catches, with most emphasis being given to recording details of the bottomfish and large pelagics at both the fish markets and the Extension Centres. From observations at the Natai facility, parrotfish, goatfish and small emperors were dominated the reef fish catches. Normally a mixed reef fish catch is so recorded,

without any separation into component groups. Occasionally parrotfish are recorded as bluefish due to the preponderance of blue species in this family.

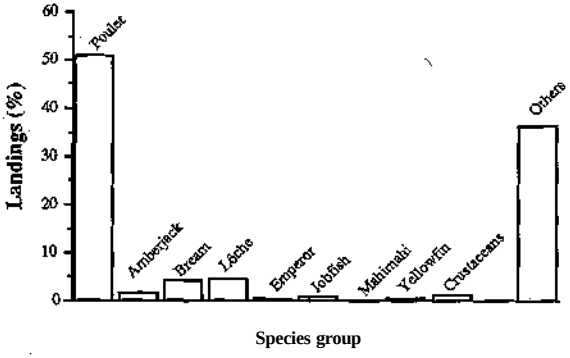

Figure 10. the composition of fish landings at Natai fish market, Port Vila, January—September 1991

Concluding remarks on the GRN and Natai data

The analyses of the GRN and Natai data presented here are not meant to be accepted as definitive studies. They are presented to show what is possible with the data presently available. These results could be greatly improved by a more detailed summary of information from the databases and, especially in the case of the GRN data base, looking at catches of individual species and species groups.

Greater definition needs to be given to the areas fished by fishermen landing into each extension centre. This information is reported on the GRN forms but was not retrievable for this study. The scatters of points in Figures 8 and 9 suggests that production models based on spatial variation in fishing effort may be a useful approach to managing deep slope fishery resources in Vanuatu

The recommended types of output that should be routinely produced from the various fisheries databases are summarised in Appendix 2. The majority of these data summaries can then be written up as an annual report on the fishing industry in Vanuatu. Attached with this report as Appendix 3 is the earlier review of fisheries research in Vanuatu by Dalzell (1990), which contains detailed synopses of the various fisheries in Vanuatu and some suggested methods about how information from these fisheries might be analysed.

PUBLICATIONS AND REPORTS

There is an increasing volume of data being collected in Vanuatu on fisheries production. Information is not only generated through records of landings but ancillary activities such as the recent smallholder agricultural survey (Anon 1991) produce substantial amounts of information on fish consumption and fishing activity for finfish and other marine resources such as trochus. However, apart from the smallholder survey, none of the information on fisheries production in Vanuatu is being regularly condensed and summarised into reports, with the result that valuable information on the status of coastal fishing in Vanuatu is not being used for development and management.

Several consultancy reports have been produced on the operations of the VFDP deep slope fishery (Anon 1987, Shepherd 1988, Anon 1992) as well as a number of internal annual reports on the activities of the Extension Centres. These reports are characteristically individual reports, not for the public domain, and do not present catch data in the form required by the extension service. What is required is a regular report on the catch data, probably in the form of an annual report on fisheries production that includes other data on shellfish etc.

FISHERIES STATISTICS AND THE FISHERIES RESEARCH ADVISER

Fisheries statistics

It should be emphasised here that the databases for fisheries production account for about 37 per cent of landed volume of fish in Vanuatu (Anon 1992). The majority of commercial fisheries production in Vanuatu is either marketed privately to restaurants, hotels and stores, or enters the subsistence economy at the village level. Some species of fin-fish and shellfish, such as mahi-mahi *(Coryphaena hippurus)* big yellowfin *(Thunnus albacares)*, wahoo *(Acanthocybium solandri)*, coconut crabs and lobsters, are rarely seen in the public markets and are mostly marketed privately to hotels and restaurants for the tourist trade. Thus the databases do not reflect the fisheries sector as a whole in Vanuatu and information from other sources will be required to give a complete picture of fisheries production.

Part of the problem relating to fisheries statistics and fisheries monitoring in Vanuatu is the limited scientific personnel available for such work. The RAB presently has one fisheries biologist who has been working mainly on trochus resources. The collection of information from the deep slope fishery was the responsibility of and ORSTOM scientist and ORSTOM has paid for the salary of one technical staff member to assist the ORSTOM scientist.

Whilst the association with ORSTOM has been beneficial, there is a negative aspect in that the RAB has not developed its own in-house capability for research and monitoring of deep slope and other fin-fish resources in Vanuatu. The new staff structure of the RAB includes two additional biologists positions and two technical officers. One biologist in the RAB should be devoted to monitoring of the village based coastal fisheries and is here provisionally designated as the Fisheries Analyst and Statistical Officer (FASO).

The duties of the FASO would be to oversee the collection of fisheries statistical information from the Extension Centres and the two Natai facilities. This would not simply mean ensuring the data was entered into the computer but checking and validating the information at the Extension Centres, improving the databases where possible based on field observations and looking at collecting information on fish landings that do not pass through the government establishments.

The main output of the FASO would be summaries of the catch and effort data summaries in report form and to supply information required by other branches of the Fisheries Department or indeed other government departments. However, the FASO should not simply be concerned with the compilation of fisheries production data, but as a biologist analyse the information and describe the nature of the fisheries and any significant observations and results.

For example, the increase in the volume of shallow water reef fish landed at government fisheries Extension Centres is an important development in the exploitation of Vanuatu's coastal fisheries resources. This switch to shallow reef fish was initiated by the Fisheries Department to relieve fishing pressure on the deep slope fisheries resources. These have not been as productive as was first thought and the profitability of village based fishermen fishing on deep slope resources is marginal.

If shallow reef fish stocks are going to be increasingly targeted in Vanuatu by commercial fishermen, then attempts will have to be made to estimate sustainable yields. The possibilities of using a production model based on spatial effort variation might also be applicable for shallow reef fisheries as has been indicated by workers elsewhere.

Research Adviser

The Research Adviser would coordinate all fisheries research related activities within Vanuatu on finfish, trochus and other molluscs, coconut crabs and subsistence fisheries. This very important, as not all fisheries research in Vanuatu has been carried out by biologists of the RAB (eg coconut crab research, trochus research) but this should still be initially reported to the Research Adviser so that progress can be reviewed and management information made available ahead of formal publication of results. The Research Adviser would liaise with regional organisations such as FFA and the SPC Fisheries Programme to undertake training of RAB staff and to conduct work that might be beyond the scope of the limited number of staff in the RAB.

The type of work to be carried out by the FASO will require a person with experience of tropical multispecies artisanal fisheries. It is likely that the FASO will be a recent graduate from a biology or fisheries degree and will not have much field and analytical experience. The same is true of the other officers in the RAB, with the exception of the senior biologist. However, given that most fisheries research functions have, until recently, been conducted by ORSTOM, there is a need for a Research Adviser to oversee and direct fisheries research in the RAB whilst the scientific and technical staff gain direct work experience.

The Research Adviser should be a fisheries scientist with considerable experience with tropical fisheries and familiar with the conditions that prevail in developing economies such as Vanuatu. The Adviser should have a strong back ground in population biology and fisheries management, and have proven abilities to collect, collate, summarise and draft reports and papers on exploited fisheries resources. Ideally, the Research Adviser would have experience of the Pacific region or the Indo-Pacific region, and be familiar with the types of fish and marine resources exploited there.

By working with the Research Adviser, the RAB staff would receive in-house training in a variety of statistical and analytical skills. The Research Adviser would implement the types of data summary and analytical routines outlined in this report and then assist staff in carrying out these tasks. The Research Adviser would set priorities for research and monitoring based on the Government policy. The RAB would then be responsible for providing an annual report on the stat*^T f fisheries production in Vanuatu, for drafting technical reports on specific fisheries and for supplying information for management and development of Vanuatu's fisheries resources.

Ultimately the need for a Research Adviser should diminish as the RAB biologists gain experience in the collection, interpretation and reporting of fisheries data. The duties of the Research Adviser would then be assumed by the Senior Biologist. The initial period where a Research Adviser is attached to the RAB should be for three years to allow sufficient time for progress to be made in the collection of data from Vanuatu's fisheries and to permit sufficient time for developing job related skills. The future of the Research Adviser could then be reviewed following this three year period

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APPENDIX 1. examples of the forms used to collect fisheries data in Vanuatu.

No. 1: ORSTOM-VFDP form

VILEJ FISING PROJEK

REKOT BLONG FISING LONG WAN TRIP Nap. 1

Nem blong kanpani : FATIWAO

Nem blong bot : FATIWAO — Hamas man i stap long bot : 3

Deit yu ko aot : 25-02-92 — Taem yu ko aot : 6-pm

Deit yu kam bak : 25-02-92 — Taem yu kam bak : 11-pm

Fising eria : South and north — Fising depth :

Hamas line yu usum : 2 (two) long dip solwota — Hamas line yu usum : long trolling

Hamas kilo fis yu kasem : 39.5 kg long dip solwota — Hamas kilo fis yu kasem : kg long trolling

Taem yu start bottom fising : 6 pm — Taem yu start troll :

Taem yu stop bottom fising : 11 pm — Taem yu stop troll :

Wanem kaen beit yu usum : local beit — Hamas kilo beit yu usum : kg

INCOME

Hamas mane yu kasem long fis sales : 7,980 VT — Nara income : VT

HAMAS MANE YU USUM

Benzene/oel : 20 litres — Repair mo maintenance :

Samting blong fising : — Freight : 2000 VT

Pay : — Ol nara expense :

Nem blong fis	Mesument blong fis (length long em)
Etelis coruscans	
Etelis carbunculus	
Etelis radiosus	
Pristipomoides multidens	
Pristipomoides filamentosus	
Pristipomoides flavipinnis	
Epinephelus magniscutis	
Epinephelus morrhua	
Epinephelus septemfasciatus	
Lutjanus malabaricus	
Aphareus rutilans	

REMARKS

No. 2: Fisheries Extension Centre Goods Received Note

REPUBLIC OF VANUATU

FISHERIES EXTENSION SERVICE
FISHERIES DEPARTMENT
GOODS RECEIVED NOTE

GRN 5603

Extension Centre Luganville. S.W. Bay Malekula. Date 24-06-92.

Fishing Project Mamanuca. Mako Procode Mamanuca. Mako

Fishing Area Dixon. S.W. Bay Trip Length 16 Hours

PIECES	SPECIES		KILOS	PRICE	VALUE
	E. carbunculus	(Red Short Tail)			
	E. coruscans	(Red Long Tail)			
	E. radiosus	(Silver Jaw)			
	P. multidens	(Large Scaled Jobfish)			
	P. flavipinnis	(Yellow Jobfish)			
	P. filamentosus	(White Poulet)	12	200	2400
	L. malabaricus	(Red Snapper)			
	A. rutilans	(Green Jobfish)			
	S. rivoliana	(Amberjack)			
	E. magniscuttis	(Spotted Loche)			
	E. morrhua	(Brn. Striped Loche)			
	E. septemfasciatus	(7 Banded Loche)			
	G. unicolor	(Dog Tooth Tuna)			
	T. albacares	(Yellow Fin Tuna)			
	K. pelamis	(Skipjack)			
	T. alalunga	(Albacore)			
	C. hippurus	(Mahi-mahi)			
	M. soheli	(Mullet)			
	S. crumenophtalmus	(Mangreau)			
	Clupea sp.	(Sardine)			
	Mixed Reef Fish				
	Other Species		1.5	150	225
		TOTAL	13.5		2625

Received from Fisheries Extension Service 2625 VT.

Signed

No. 3: Natai Fish Market, Port Vila, Good Received Note

"NATAI"

PORT VILA FISHERIES LIMITED
P.O. Box 883, Port Vila — Telephone : 23344
P.O. Box 211 — Luganville, Santo — Telephone : 36841

GOOD RECEIVED NOTE Nº 13619

Date : 22/9/92

Received from : Lakatoro Malekula

AWB No :

Bag No's :

CODE
Grade A - First Grade
B - Second Grade
C - Third Grade
IKE - Killed
HIG - Headed & Gutted
H/G - Head Off
G&G - Gilled & Gutted
WH - Whole
L - Live
D - Dead
F - Frozen

Description of Goods	Code	Kgs	Price	AMOUNT Vts
POULET		80.6	310	24.986
SNAPPER		4.5	280	1.260
LOCHE		18.9	220	4.158
REEF FISH		23.2	255	5.916
AMBER JACK		2.4	200	480
SNAPPER REJECTED		16.6		—
POULET		8.6		—
	Total Kgs	129.6	Sub Total	
			Freight Ded	
			Other Ded	
			Total Payable	36.800

Goods Received Signed :

Approved Payment Signed :

Cash

Cheque No. 052540

No. 4: Fisheries Training Centre fishing record

RECORD OF TRAINING TRIP NO._____

NAME OF BOAT_____ INSTRUCTOR_____
TRAINEES 1._____
2._____
3._____
4._____

DATE OUT_____ DATE IN_____ TIME OUT_____ TIME IN_____

NO.HOURS OUT_____ DAY/NIGHT FISHING_____ FISHING AREA_____

BAIT_____ FUEL USED_____

TOTAL WHT. LANDED_____KG.

SPECIES	NOS.	KG.	VT/KG
1.Etelis coruscans			
2. " carbunculus			
3. " radiosus			
4.Pristipomoides multidens			
5. " filamentosus			
6. " flavipinnus			
7.Epinephelus magniscuttus			
8. " morrhua			
9. " septemfasciatus			
10.Lutjanus malabaricus			
11.Aphareus rutilans			
12.			
13.			
14.			
15.			
16.			

TOTAL REVENUE_____ VT.
MONEY FROM SANTO FISH_____ PAID TO TREASURY_____
% TO INSTRUCTOR_____ % TO TRAINEES_____
SEA ALLOWANCE TO INSTRUCTOR _____50VT.TO INSTRUCTOR_____

COMMENTS.

APPENDIX 2. Suggested criteria for report programmes for fisheries databases

Extension centres GRN database

1. Monthly catch by weight and numbers, and value in Vatu by extension centre
2. Monthly fishing effort in trips and trip hours by extension centre
3. Monthly average trip hours by extension centre
4 Fishing effort from (ave trip hours x no trips) by extension centre
5. CPUE in No/trip-hr and Wt/trip-hr by extension centre
6. Same as the above but with individual species or species groups.
7. Same as the above but using records from individual fishermen or fishing groups
8. Species composition by month in numbers and %, and weight and %, for each extension centre with an annual summary
9. Species composition by month in numbers and %, and weight and %, for individual fishermen or fishing groups
9. All the above to be printed as tables for years specified

Natai GRN database

1. Monthly landings by species in weight and %, and annual summary
2. Monthly value of landings by species groups
3 Monthly summary of landings by species by source of supply
4. All the above to be printed as tables for years specified

ORSTOM fishermen catch sampling form

1. Monthly summary of catch returns by month by different islands/fishing ground
2. Monthly summary of catch, effort and CPUE for island/fishing ground for bottom fishing and troll fishing
3. Species composition by month for bottom fishing and troll fishing by island/fishing ground
4. Monthly summary of CPUE for different species from bottom /fishing and troll fishing by month
5. Monthly income from fishing by fishing ground/island
6. All the above to be printed as tables for years specified

FTC training vessel catch database

1. Monthly landings by species in weight and numbers and annual totals

2. Monthly landings by species in percentage weight and numbers and annual means.

3. Monthly total CPUE by gear type for total catch

4. Monthly total CPUE by gear and species

APPENDIX 3

A review of fisheries research activities in the Republic of Vanuatu

by

P. Dalzell
Inshore Fisheries Scientist
Inshore Fisheries Research Project
February 1990

South Pacific Commission
Noumea, New Caledonia