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SOME ASPECTS OF THE RESOURCES AND EXPLOITATION OF THE PAPUA NEW GUINEA REEF AND LAGOON ASSOCIATED COMMERCIAL SESSILE

by

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SOME ASPECTS OF THE RESOURCES AND EXPLOITATION OF THE PAPUA NEW GUINEA REEF AND LAGOON ASSOCIATED COMMERCIAL SESSILE INVERTEBRATES

1.INTRODUCTION

1.1 The general marine environment in PNG

Papua New Guinea (PNG) is an island nation with more than 400,000 people or 13.4% of the nation's population living in rural and urban coastal areas (Bureau of Statistics, 1983). It has a coastline of more than 10,000km. There is a shelf area of 17,000,000 ha at less than 200m depth, of which 23.5% is reef occurring within a depth of 30m (Munro 1976; Wright & Richards,1983). Extensive reefs are found in the central, Milne Bay, North Solomons, New Ireland and Manus Provinces (Munro, 1976) (Fig.1). Other coastal provinces have narrow shelves and discontinuous reefs, while the central Gulf of Papua has little coral due to turbidity as a result of enormous suspended sediments in the water column and freshwater inflow from some of the country's largest rivers (Wright, et el, 1983).

1.2 Present general level of village technology relating to fisheries

In recent years traditional fishing gears using local materials in combination with traditional knowledge and beliefs (Johannes 1982) have been increasingly replaced by the use of modern, imported fishing gear. However, boat building technology, preservation methods and the development of marketing have not kept up with the same pace. Thus the main fishing craft remain traditional dugout canoes which are sometimes powered by outboard engines. Processing is mainly by smoking and fishing is generally and done mainly for subsistence, barter trade, or local markets (Frielink Jr, 1983).

2. BACKGROUND

2.1. History of exploitation of trochus, green snail, beche-de-mer

The exploitation of reef associated sessile organisms in PNG has a long history dating from the original coastal settlers who probably harvested organisms such as beche-de-mer, and shells for subsistence purposes. During this century, exploitation of these resources increased when demands for them by Europeans and Asians provided a cash market for them. There was a peak in harvest during the 1950's when up to 300 tonne of green snail, 1000tonne of trochus and an estimated 80 tonne of beche-de-mer were

harvested annually (Glucksman et al, 1982).

The incentive for this harvest was believed to have been largely supplied by Asian businessmen, who had established small stores in PNG and were buying the products to export to known markets in their home countries. With a decrease in the activities of such traders in the in the 1960's, and 1970's, the annual harvest decreased to approximately 300 tonne trochus, less than 40 tonne green snail and less than 20 tonne of beche-de-mer each year (Wright, 1986).

Over the past decade there has been an an observed increase in world demand for these products with the result that renewed interest is beginning to be placed on PNG's resourcs. Since 1980, more than 2000 tonne of trochus shell valued at over K2.5 million, 200 tonne of green snail valued at >K600,000 and over 100 tonne of beche-de-mer valued at K300,000 have been exported (Wright, 1986).

2.3 The need for better undertanding of the resources

The increases in production are at present thought to be negligible, but because of the fast pace at which the increases are happenning, there is concern for better understanding and management of the fisheries for these organisms. It is anticipated that the exploitation level will continue to rise rapidly. There has been some suggestion that even at present levels of exploitation, some instances of over exploitaion may have occurred (e.g Ito et al, 1984).

The financial benefits to coastal residents from these resources is significant compared to the benefits they receive from large scale fishing operations whose only remuneration is in the form of taxes paid to the government of PNG.

The Department of Fisheries and Marine Resources in realizing the economic importance of these resources and the implications of increased, uncontrolled exploitation initiated in 1987 a research project with the following main activities:

1. Carry out an economic assessment of the PNG harvest of these sedentary organisms;

2. Carry out resources assessment in selected reef areas;

3. Carry out a socio-economic assessment to measure the village use of thess resources; and

4. Investigate the possibilities of a mariculture and/or a restocking programme for trochus and giant clams

In this report, an attempt is made to summarise some of the work already carried out and put to perspective the future of the fisheris and intention of the Research Division of the Department of Fisheries with regard to management on the fisheries.

3. ECONOMIC ASSESSMENT

3.1 Introduction

Dispite the long history of exploitation and importance there is at present no reliable system of data base acquisition. The lack of financial and skilled manpower resources are implicated once again. Accounts of production have been discussed by Glucksman et.al (1982) and Wright (1986)

3.2 Aims

Attempt to compile a document containing production figures by provinces or region which can be updated annually and set up and co-ordinate a data acquisition system for it.

3.3 Methods

How the data can be collected is discribed by Wright (1986). This involves the analysis of data availabla with the Fisheries Inspection and Surveillance Section. The informaton is in actual fact records of export date, shipping information, type of product and its value.

The information however does not specify origins of products which may be useful as indicator of levels of exploitation in each province or region. A form (Appendix 1.) which is hoped to be made into a receipt book for dealers' use is presently being tried out with a sample of dealers.

3.4 Results

An initial account (which is an example of the sort of information acquisition envisioned) documenting the exports of marine products from PNG has been given by Wright (1986) (Table 1). There were however many instances of inconsistencies of records of values of exports. Many export records showed large shipments were either over- or under- valued. These presented serious doubts as to the honesty of the officers inspecting exports shipments (Wright pers. comm).

The collaboration of extention officers located in provinces has resulted in a clear view of fisheries in specific areas, e.g. numbers of buyers and exporters and production.

3.5 Initial Conclusions

It is apparent from the work done so far that there in clearly no idea of the present real magnitude of PNG's total production. There is also no clear knowledge as to how many licensed dealers there are. There is indications that the number of dealers is large (e.g. 10 in Kavieng alone). All of these do not have recent export licences let alone licenses to deal, though each has a monthly average shipment of c.5 t trochus and 200kg green snail.

It has also become clear that there is no clear management guideline at presnt. Although the size limit of 6.5cm is used as the legal minimum export size, this is not clearly specifies in any official document.

4. RESOURCE ASSESSMENT SURVEYS

4.1 Introduction

Resources assessments relating to marine invertebrates in PNG is apparently not new. During 1980 a survey using transect observations was undertaken over reef areas of Milne Bay (Chesher, 1980). A number of other surveys were carries out by various other workers (e.g. Rau & Seri,1980; Shelley , 1981). These studies contributed to some of the earlier knowledge in the region on the species, habitats, distribution, and biology of the various animals (e.g Shelley (1980) on that of holothurians).

4.2 Aims

The main aim of the work is to compare abundances between known areas of heavy exploitation and areas of minimum exploitation especially to measure levels of stocks of trochus, beche-de-mer, green snail, giant clams, blacklip oyster, and lobsters (see Appendix 2).

The aims of the initial work carried out in the Tigak Is. of an area already discribed on numerous accounts (e.g., Wright, et al (1985) included the training of staff on survey techniques, habitat identification, animal identification and verification of these both in the field and lab.

4.3 Methods of survey

Trochus and greensnail:

Because of the criptic nature and habit of trochus (Nash, 1987), and greensnail (Tarr pers. comm.), the visual recording of numbers of these animals underwater require the setting of transect lines and close scrutiny of the habitats.

Our transect lines incuded a 100m kuralon rope which is unreeled by one diver parallel to shore. Two other divers would swim along this set line in one direction and then back collecting and/or recording the numbers of invertebrates seen or found within 2m on either side of the line, (400mkm sq.). These were set at approximately 5m depth intervals parallel to shore. SCUBA is used in the majority of cases although in very shallow areas, snokel counts were made.

Large and encrusting tridacnids were measured underwater using plastic tape measures. After working each transect the line is reelled and reset at a different depth.

The collected animals are measured with calipers and conditions (dead or worm damaged) recorded before being returned to the water.

Beche-de-me and Giant clams

The same data sheet is used but manta tows both with snokel and SCUBA were made. With these often whole habitat areas were covered (e.g reef area of small islands)

4.4 Results

At present the data remains unanalized.

5. SOCIO-ECONOMIC ASSESSMENT

5.1 Aims

To assess the traditional use of the various resources particulaly giant clams which are exploited for export in some areas of PNG.

Presently, no work is carried out on this, but interest in this has been given by other government departments, specifically the Environment and Wildlife Conservation Department.

Fig 1.

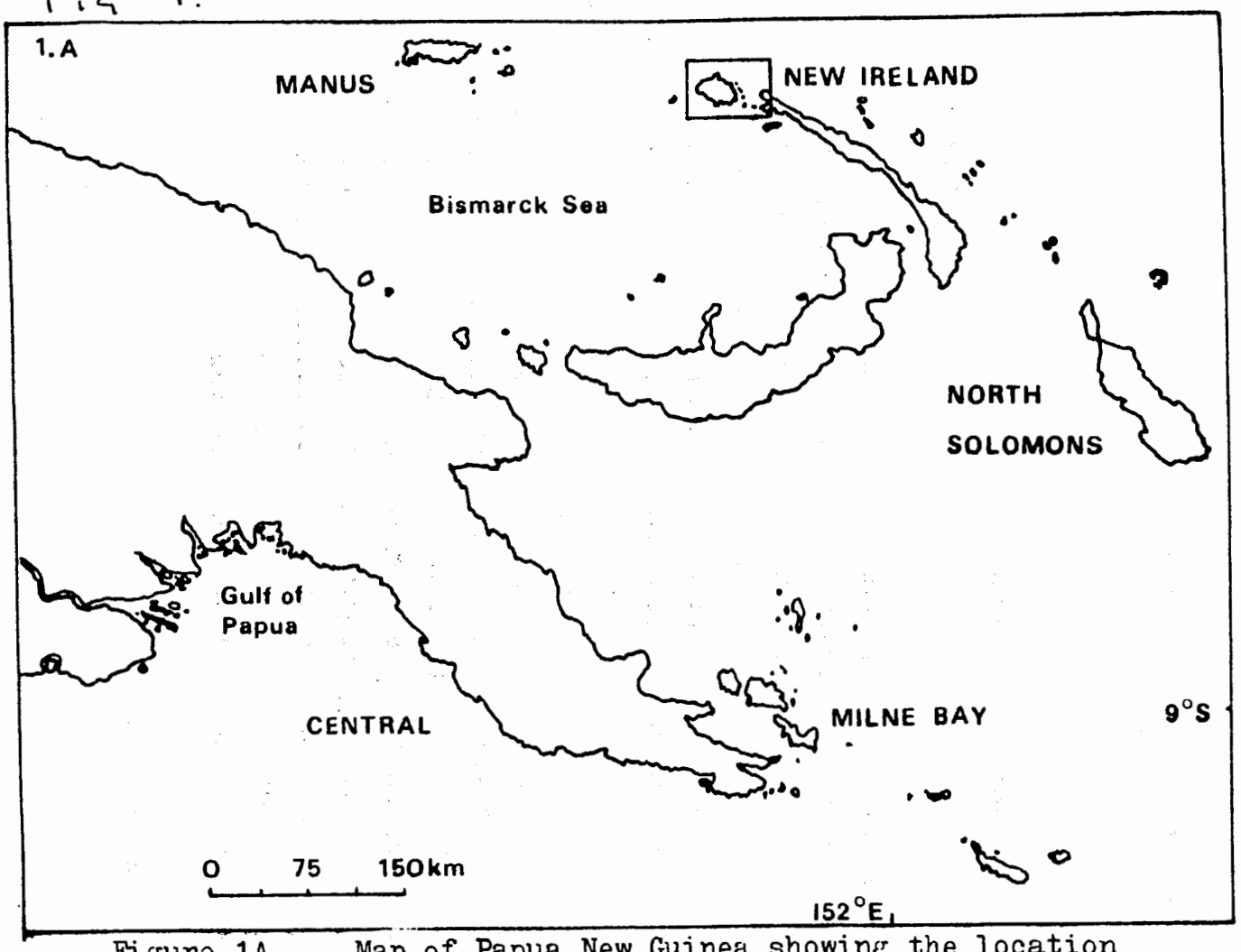
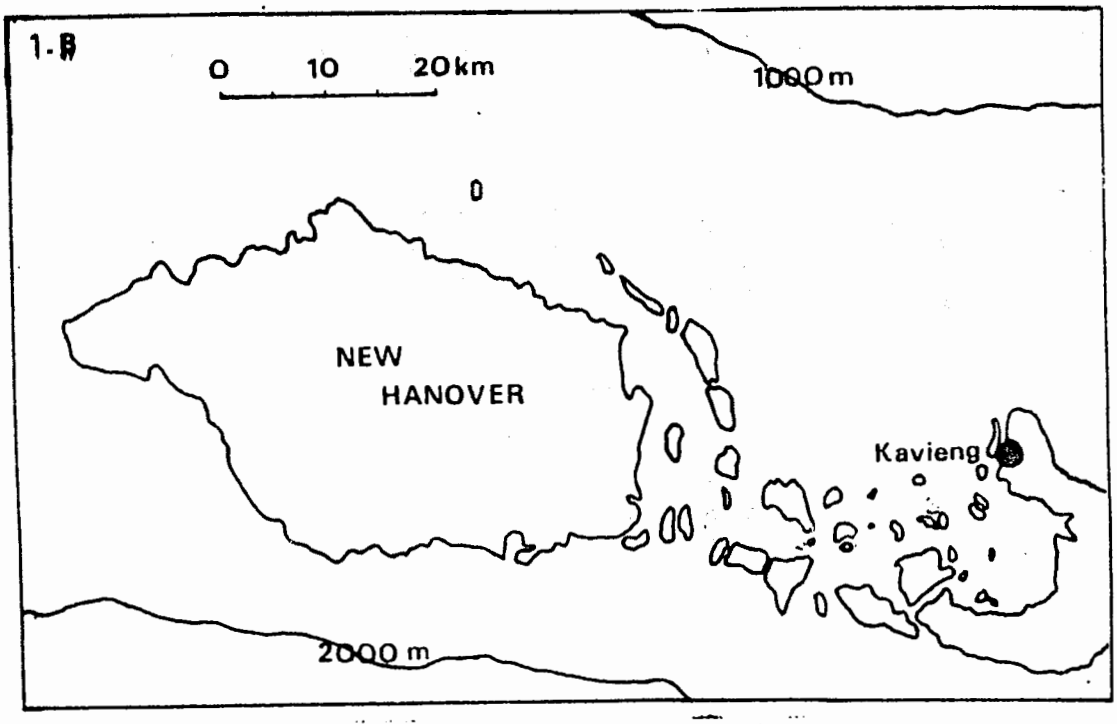


Figure 1A Map of Papua New Guinea showing the location of the study area. (After Wright et al 1983)



1B Inset showing the Tigak Islands between Kavieng and New Hanover.

Table III. The quantity(kg) and value(K) of miscellaneous marine resources exported from PNG between 1980 and May, 1986. (Source Wright, 1986)

Export Item		1980	1981	1982	1983	1984	1985	1986 to May
Trochus	Kg	327,371	187,909	278,297	357,191	310,000	450,290	223,215
	K	309,609.17	147,746.65	248,763.15	372,797.65	379,027.74	693,478.44	359,637.85
Green Snail	Kg	28,710	17,294	35,313	27,477	21,382	11,745	9,090
	K	148,006.39	57,746.93	113,459.36	106,553.30	107,085.57	67,718.65	51,385.90
Black Lip	Kg	8,375	4,993	1,863	14,367	6,500	4,016	1,575
	K	12,582.08	8,584.00	3,002.60	25,500.79	8,655.76	9,351.99	2,677.50
Gold Lip	Kg	74				53		
	K	118.40				58.30		
Beche-de-mer	Kg	2,351	11,090	22,960	7,130	4,668	15,163.5	16,919.9
	K	7,445.00	25,965.66	73,409.39	23,939.32	13,472.49	55,716.43	78,666.52
Shark	Kg		470,910	472,095	80,000	100,000	110,000	45,000
	K		117,712.00	117,523.75	20,000.00	28,700.00	101,750	40,500.00
Mixed Fish	Kg			14,113	856	33,348	39,206	15,000
	K			28,112.00	2,240.80	124,853.80	69,149.17	19,800
Shell Meat	Kg			80	10,204	949	2,502	1,500
	K			70.97	13,294.00	3,407.00	14,482.00	9,750.00
Fish Fillet	Kg			1,421	8,200			
	K			2,729.75	20,999.00			
Shark Fin	Kg							540
	K							1.108.50

Appendix 1

Form used experimentally to provide crude measures of regional levels of exploitations

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DATE_____ BUYER OR RECORDER_____

VILLAGE_____ FISHERMEN'S NAME_____

NO.COLLECTORS_____

NO. DAYS SPENT COLLECTING_____

LOCAL NAME OF REEF/S_____

PRODUCT	WEIGHT (KG)	PRICE (K/KG)	TOTAL VALUE (K)
TROCHUS			
GREEN SNAIL			
BECHE-DE-MER			

APPENDIX 2.

The data sheet used printed onto waterproof paper.

(SIDE 1 OF SHEET)

INVERTEBRATE DATA SHEET. FISHERIES RESEARCH KAVIENG.PNG

Locality_____ Date___/___/____ Recorder_____			
Collector_____			
Transect Number_____			
Time of Day_____			
Location on reef_____			
Water Depth (m)_____			
Transect Width (m)_____			
Duration (min)_____			
COUNTS OF ANIMALS			
Trochus nilo_____			
Turbo marm_____			
Tridacna gigas_____			
T. maxima_____			
T. derasa_____			
T. squamosa_____			
Hypopus hypopus_____			
Others (specify)_____			
Blacklip oyster			
Black teat fish_____			
White teat fish_____			
Sand fish_____			
Prickley red fish_____			
Blach fish_____			
Deepwater red fish_____			
Red surf fish_____			
Stone fish_____			
Elephant's trunk fish_____			
Amber fish_____			
Lolly fish_____			
Pink fish_____			
Curry fish_____			
Leopard fish_____			
Brown sand_____			
Others (speify)_____			
Spiney lob (specify)_____			
BOTTOM TYPE %			
COVER:0%=0;1-5%=1;6-30%=2;31-50%=3;51-75%=4;76-100=5			
Sediment: Mud_____			
Sand_____			
Rubbles_____			
Blocks_____			
Live hard corals_____			
Soft corals/sponges_____			
Dead standing corals_____			

Appendix 2

(SITE 1 CONT..)

Crustose corallines			
Weeds/Seagrasses			

OTHER NOTES

Temperature.....Salinity.....Turbidity.....

Sample numbers for analysis.....

Appendix 2.

(Size 2 of sheet)

SUMMARY OF DATA AND LENGTH FREQUENCY MEASUREMENTS

Transect Number	Name of animal	Number of individuals	Length (cm)	Width (cm)	Weight (gm)