

FISHERIES RESEARCH BULLETIN OF TONGA

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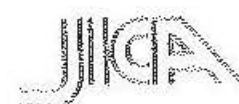
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Foreword

It is my great pleasure to announce the publication of Fisheries Research Bulletin of Tonga. Fisheries products play very important roles in the diet and culture of the Tongan people and in foreign trade of the country. Therefore, the optimum and sustainable utilization of the fisheries resources are essential issues in the country's development. I cannot therefore over-emphasize the importance of scientific fisheries research to ensure the wise utilization of fisheries resources. This bulletin is not only a milestone in scientific research conducted in Tonga but also an instrument to facilitate exchange of scientific information with foreign countries. I hope that the contents of this bulletin will ever be enriched through the effort of Tongan fisheries scientists. Suggestions, opinions or criticisms on the articles contained in this bulletin are most welcome for the progress in fisheries research of the country.

Finally, I would like to express my appreciation to Japan International Cooperation Agency and fisheries experts despatched by the Agency to Tonga whose effort has made the publication of this bulletin possible.

15 July 1994

Sione Tualau MANGISI
Secretary
Ministry of Fisheries

Purpose of This Bulletin

Establishment of fisheries resource management is a prerequisite to the sustainable development of fisheries. In the Aquaculture Research and Development Project which was commenced in October 1991 as a joint project between Tongan Ministry of Fisheries and Japan International Cooperation Agency, we have been making a great deal of effort to establish such technology. This bulletin contains reports on the results of the research conducted as part of the project. I am convinced that each report marks a step toward the final goal, even though we still have to go a long way before successful fisheries resource management is a reality in Tonga. We also intend to exchange views and knowledge on the management of fisheries resources with the fisheries scientists of not only South Pacific region but also of the world through wide distribution of this bulletin.

15 July 1994

Hiromu IKENOUE
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Operation Pattern of Fish Markets on Tongatapu Island

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Abstract

One week survey on sales of fisheries products was conducted at Vuna and Faua (road side) fish markets in Nuku'alofa, Tongatapu Island. The largest sale was recorded for Saturday followed by Friday. Peak time of sale in a day was 7:00-10:00 am and 15:00-17:00 pm at Vuna market and around 7:00 am at Faua market. A total of 2,496 strings of fish, 87 strings of crustacean and 824 baskets of mollusks were sold during the survey period. The total amount of fisheries products sold at the markets was estimated as 9,984kg in weight and T\$24,960 in value. Rabbitfish (*Siganus* spp.), parrotfish (*Leptoscurus vaigiensis*) and thumbprint emperor (*Lethrinus harak*) were sold in the largest amounts among fish, and ark shell (*Anadara* spp.) and giant clam (*Tridacna* spp.) among mollusks. In crustacean, lobster (*Panurilus* spp. and *Scyllarieds* sp.) and mud crab (*Scylla* sp.) appeared in the market during the survey.

Introduction

The people of the Kingdom of Tonga have a strong preference to eat marine fisheries products. The fish supply system in the Kingdom is rather simple since fishermen return to the wharf and sell their catch directly to the consumers. Although there are statistics on deep-sea bottom fisheries and longline fisheries for export market, there is no statistical data available for inshore artisanal fisheries which serves for local consumers. The purpose of the present study is to reveal the operational pattern of the fish

markets and to estimate sales in weight and value on Tongatapu Island where 67% (63,794 people or 9,723 households in 1986; Statistics Dept., 1991) of the Kingdom's population reside and the most of real consumers exist.

Method

Three surveyors were posted at Vuna and Faua (road side) fish markets (Fig. 1) from 5:00 am to 7:00 pm from Monday, April 6, to Saturday, April 11, 1992. There was no special public holiday or event around the survey week. No fish are sold and no fisherman can go fishing on Sunday. Fish were coded into 14 groups. Mollusk and crustacean were divided into 7 and 4 groups, respectively (Table 1). Fish sellers sell

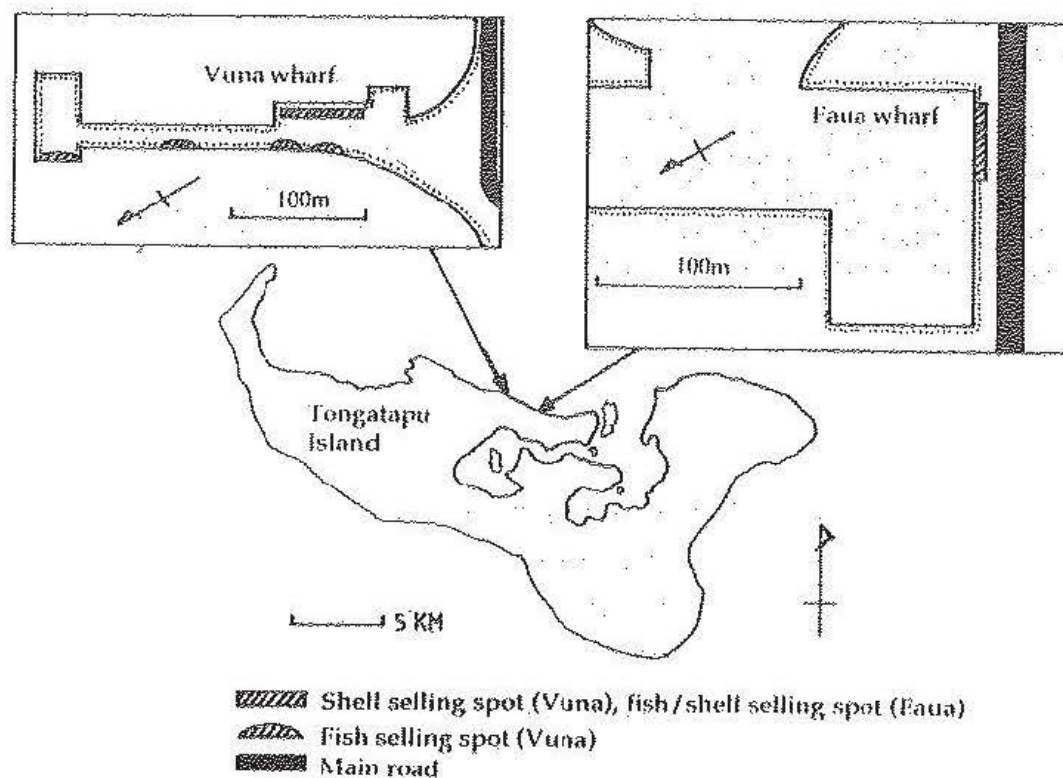


Fig. 1. Location and shape of Vuna and Faua fish markets.

Table 1. Coding of fisheries products.

	Code	English name	Tongan name
Fish	F1	Rabbitfish	O
	F2	Goatfish	Vete
	F3	Parrotfish	Hohomo
	F4	Thumbprint emperor	Tanutanu
	F5	Spangled emperor	Koango
	F6	Unicorn	'Ume lei
	F7	Surgeon fish	Bone
	F8	Parrotfish	Ufu
	F9	Tuna, skipjack	Atu etc.
	F10	Mullet	Fua
	F11	Silver biddy	Matu
	F12	Sea bream	Mu
	F13	Groupers	Ngatala
	F14	Others	
Mollusk	M1	Giant clam	Vasuva
	M2	Ark shell	Kaloa'a
	M3	(Venus clam	To'o
	M4	Lucina clam	Tu'ulalo
	M5	Turban	'Elii
	M6	Octopus	Feke
	M7	Others	
Crustacean	C1	Lobster	'Uo
	C2	Crab	Kuka
	C3	Mud crab	Tolitoli
	C4	Others	

fish and crustacean in the unit of "string" by piercing several fish or crustacean with a string, and mollusk in the unit of "basket". For each sale, time and kind of the fish sold as well as number of strings or baskets were recorded. Any information related to the market activity was also recorded during the survey.

Results

In terms of total amount of fisheries products sold at Vuna

and Faua markets combined, the largest amount was recorded for Saturday followed by Friday. The smallest sale was recorded for Monday (Fig. 2). The operation

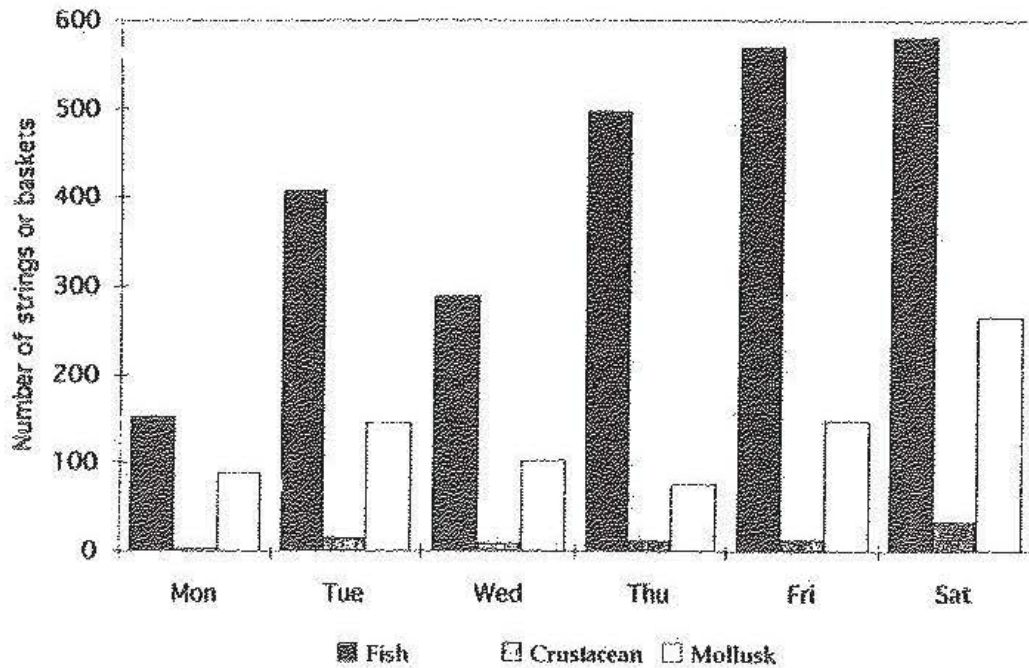


Fig. 2. Sales of fish, crustacean and mollusk by day of the week at Vuna and Faua markets.

pattern of Vuna market was totally different from that of Faua market. At Vuna market fish sellers started to come at 6:30, then consumers started to buy fish after 7:00 am. The market was open until 6:00 pm. At Faua market, fish selling started as early as 5:00 am and the market closed around 8:00 am. Faua market attracted consumers again when day going fishermen came back to the port around 4:00 pm. A substantial amount of fish and lobster were sold at Faua even though the selling time was only during 6:00-8:00 am. At Vuna market, fish sellers were fishermen themselves or family members of the fishermen. Peak hours of sale were recorded around 7:00-10:00 am and 15:00-17:00 pm for fish (Fig. 3), 8:00-12:00 am and 14:00-17:00 pm for mollusk (Fig. 4)

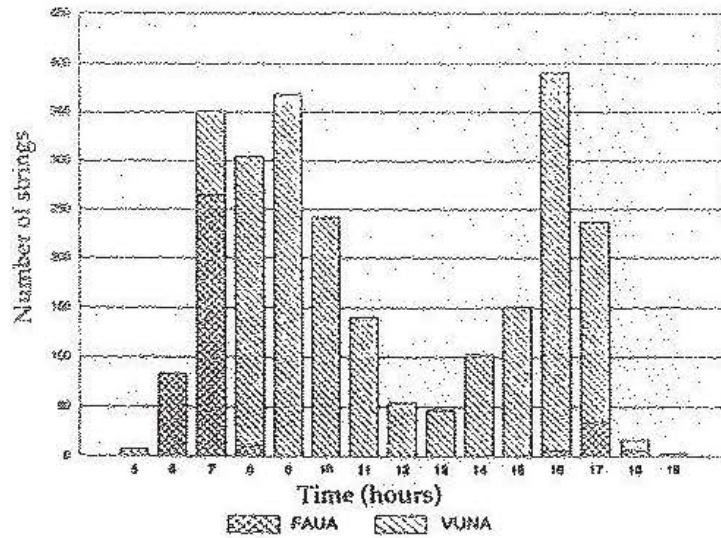


Fig. 3. Sales of fish by time and location.

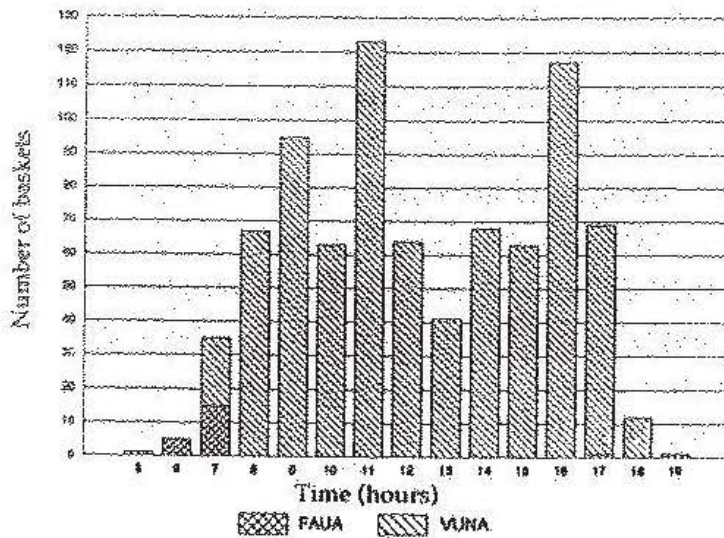


Fig. 4. Sales of mollusk by time and location.

and 7:00-9:00 am for crustacean (Fig. 5). Landings on Monday morning and Saturday afternoon were very small.

Leftover fish at both markets was taken elsewhere except for some fish leftovers in the morning sale at Faua market

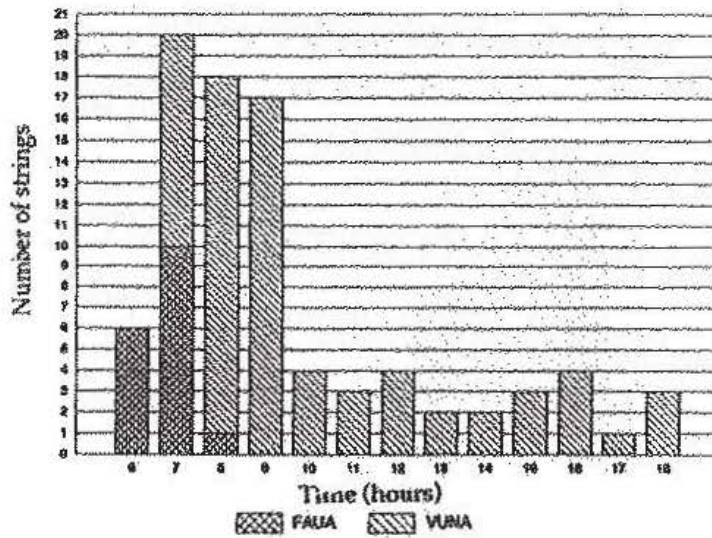


Fig. 5. Sales of crustacean by time and location.

which were transported to Vuna market. Some of the leftover shell was kept for the next day's sale at Vuna market. Ark shell (*Anadara* spp.) brought from Ha'apai was sold in plastic bags and leftover shell was kept in the lagoon behind the shell selling stalls. The shell was again collected in the following morning by a diver wearing a mask and snorkel then put in the plastic bag again for the day's sale. There was a night watch to protect the shell from poaching. There were some fishermen or fish sellers who came to sell their fish at Vuna wharf from the southern side of Tongatapu Island by cars. They sold lobster (*Panulirus* spp.), parrotfish (*Leptoscarus vaigiensis*), rabbitfish (*Siganus* spp.) as well as mullet (Mugilidae). They stayed at the market only for a short period (less than one hour) and left the market whether or not all of their fish had sold. There were people selling ice stored fish from Vava'u and Ha'apai on Friday and Saturday. They came by a truck with a big ice box filled with fish. The price of fish was T\$ 2.80/kg regardless of fish species. It was found that fishermen as well as shell sellers kept some fish and shells

the fish or shells that were on display were sold then new fish or shells were taken out from the cabin or storage for sale.

Among the fish species, rabbitfish (*Siganus* spp.) were sold most (19%), followed by parrotfish (*Leptoscarus vaigiensis*, 15.8%) and thumbprint emperor (*Lethrinus harak*, 12.9%). Among crustacean, lobster (*Panulirus* spp., *Parribacus caledonicus*, and *Scyllarieds* sp.) as well as mud crab (*Scylla* sp.) appeared in the market during the survey. Among mollusk, ark shell (*Anadara* spp., 33.1%) was sold most, followed by giant clam (*Tridacna* spp., 23.7%).

A total of 2,496 strings of fish, 87 strings of crustacean, and 824 baskets of mollusk were sold during the survey period. Assuming the average weight of a string is 4kg and the average price is T\$ 10, then weekly fish sales are estimated as 9,984kg in weight and T\$ 24,960 in value. Weekly sales of crustacean are estimated as 261kg in weight and T\$1,740 in value by assuming average weight and price of a string to be 3kg and T\$20, respectively. In the case of mollusk, as the average weight is 4kg and average price is T\$5 for each basket, the weekly sales are estimated as 3,296kg in weight and T\$4,120 in value. 85.2% of the total sales in value was sold at Vuna market and the rest was sold at Fuaa.

Discussion

It is almost impossible to grasp whole picture of the sale from the present one week long survey. However, if above mentioned estimates are applied, the annual sale of fish, crustacean and mollusk are estimated as 499.2 tons, 13.1 tons and 164.8 tons, respectively. The annual sale of all fisheries products is, therefore, estimated as 677 tons in weight and T\$1.5 million in value. Applying 25% as the ratio of

subsistence usage for urban area (Carleton, 1982), total landing by the fishermen in Nuku'alofa would be 902.7 tons. The missing part of the present survey is the catch taken by very small boat fishermen who land their catch in the home village area. Therefore, it is necessary to survey island-wide fish landings in different seasons taking into account the moon phase, weather and annual events to confirm the true figure of the fisheries production on Tongatapu Island. Ideally, a small fisheries office should be built at Vuna wharf where incoming fisheries products are all checked. Two fisheries officers should be stationed there to collect landing and sales data as well as to enforce fisheries regulations in future.

References

- Carleton, C. 1982. Fish marketing and distribution in Tonga. RAS/73/025, FAO, Rome.
- Statistics Dept. 1991. Population Census 1986.