



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

RESEARCH REPORTS IN THE ECONOMICS OF GIANT CLAM MARICULTURE

Working Paper No.1

**Market for Giant Clam Shells: Report on a
Survey of Retailers and Wholesalers in
Southeast Queensland, Australia**

by

Clem Tisdell

November 1989



ISSN 1034-4294

**RESEARCH REPORT OR PAPERS IN ECONOMICS OF GIANT CLAM
MARICULTURE**

Working Paper No. 1

**Market for Giant Clam Shells: Report on a Survey of
Retailers and Wholesalers in Southeast Queensland,
Australia¹**

by

Clem Tisdell²

November 1989

© All rights reserved

¹ Research for this Report has been undertaken as a part of the Project "A Market Study of Pacific Giant Clam Products" for which Professor Yung C. Shang, Department of Agricultural and Resource Economics, University of Hawaii is Project Co-ordinator. It has been funded mainly by the Research Corporation of the University of Hawaii on behalf of the Centre for Tropical and Subtropical Aquaculture, Hawaii. This research complements Australian Centre for International Agriculture Research (ACIAR)Project 8823, "Economics of Giant Clam Mariculture" being undertaken at the University of Queensland and supplementary funding was provided by ACIAR for this research out of funds for Project 8823.

² School of Economics, The University of Queensland, St. Lucia Campus, Brisbane QLD 4072, Australia
Email: c.tisdell@economics.uq.edu.au

This Series, *Research Reports and Papers in the Economics of Giant Clam Mariculture*, is supported by the Australian Centre for International Agricultural Research (ACIAR) Project 8823 and published by the Department of Economics, University of Queensland, Queensland 4072, Australia. (See next page for more information)

This research has been partially funded by ACIAR Project No. 8823, Economics of Giant Clam Mariculture.

For more information write to Professor Clem Tisdell, School of Economics, University of Queensland, St. Lucia Campus, Brisbane 4072, Australia or email c.tisdell@economics.uq.edu.au

Table of Contents

	Page No.
Abstract	1
1. Background	2
2. Varieties of Clam Shells Sold, Sizes and Uses, Market Segmentation	4
3. Prices	7
4. Quantities Sold of Shells, Sources and Availability of Supply	11
5. Type of Customer Purchasing Giant Clam Shells	12
6. Market Prospects for Giant Clam Shells obtained from Mariculture	13
7. Discussion	16
Appendix A. Survey Form:Survey of Souvenir Shops re Demand for Clam Shells and Products Made from Giant Clam Shells.	18
Appendix B. List of Responding Retailers and Wholesalers of Giant Clam Shells.	24
Appendix C. Table of Giant Clam Shell Prices as Notified by Individual Wholesalers and Retailers.	25

Report on a Market Survey of Retailers and Wholesalers of Giant Clam Shells in Southeast Queensland, Australia

ABSTRACT

Reports the results of a survey of wholesalers and retailers of giant clam shells in Southeast Queensland undertaken in August 1989. The most common variety of clam shell was that of *Hippopus hippopus* (the horseshoe clam) with that of *Tridacna squamosa* (the fingernail clam) being the second most frequent. Shells of *Tridacna porcellanus* (the china clam) and of *Tridacna gigas* were also available but in extremely short supply. Only shells of these species appear to be in real demand. Shells of other species have unsatisfactory characteristics but shells of the species in demand are not perfect substitutes - the market is segmented. Information is presented on prices and quantities of clam shells sold. Currently, there seems to be an Australian market for about 100,000 to 120,000 clam shells per year. Practically all clam shells were imported from the Philippines but supplies are becoming scarce as CITES takes effect and natural stocks become exhausted. This is reflected in the unavailability of larger shells and the sale of shells of lower quality than in the past. Tourists possibly account for 60 - 70 per cent of sales of clam shells but only a small percentage (10%?) of sales are to overseas tourists because of weight problems. A reasonably high proportion of clam shells appear to be purchased by restaurants and directly by householders. Practically all shell outlets expressed interest in obtaining clam shells from farms and provided information on the type of shells which they would like to see produced. Most thought that there would be a 'good' market for clam shells obtained by mariculture.

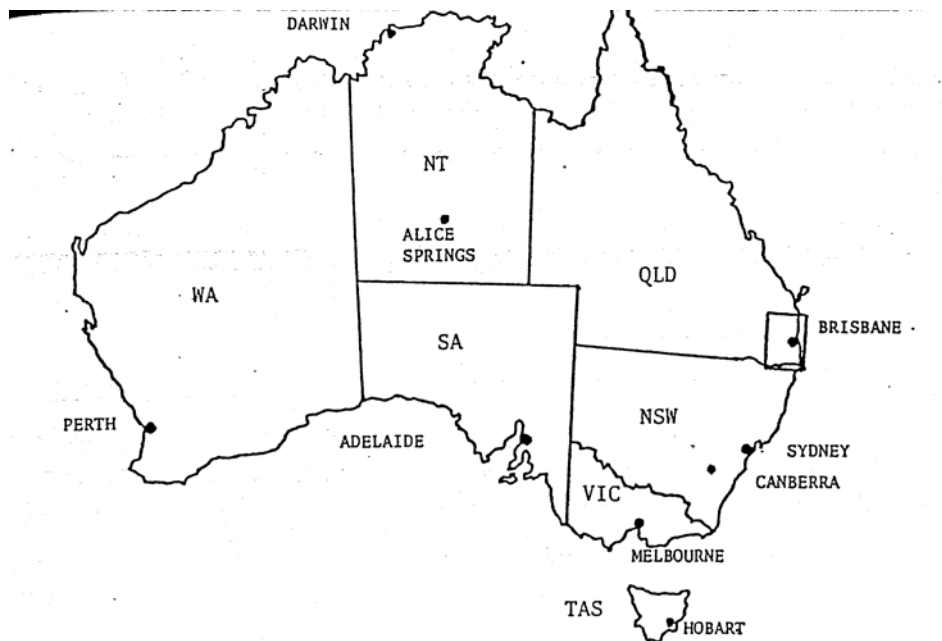
Keywords: Giant Clams, supply and demand,

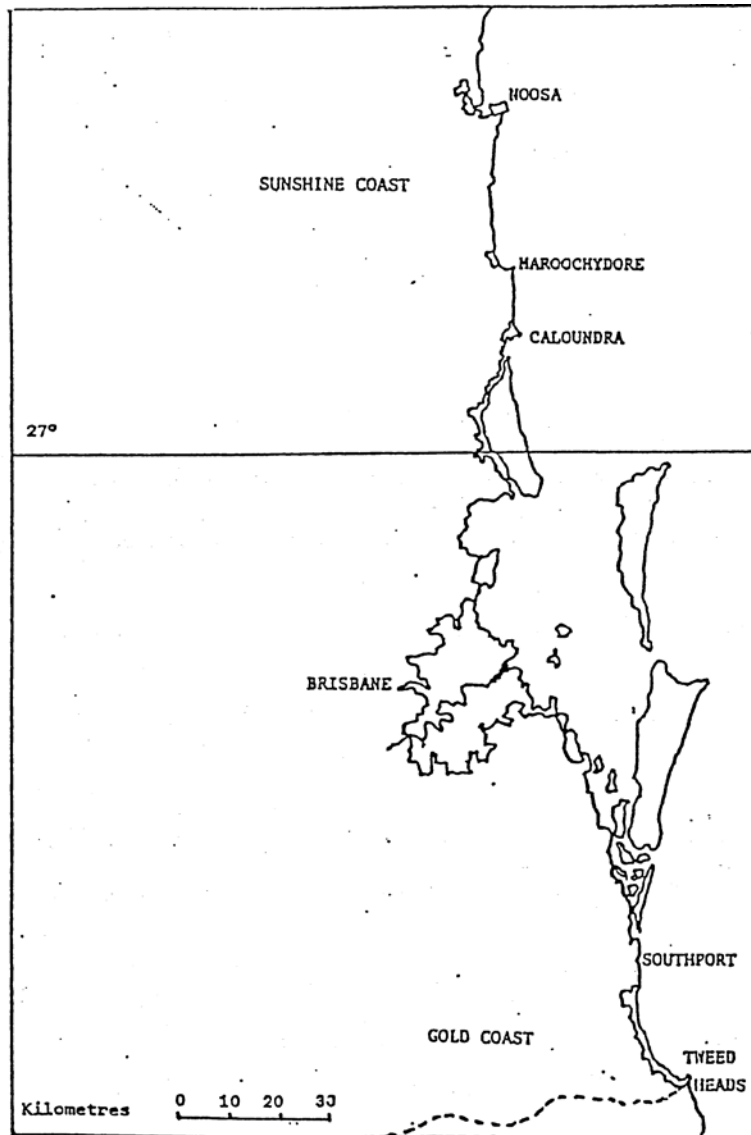
JEL Classification: Q57, Q31

Report on a Market Survey of Retailers and Wholesalers of Giant Clam Shells in Southeast Queensland, Australia

1. Background

A direct survey using the questionnaire attached as Appendix A of souvenir/gift shops and of wholesalers of shells located in the Brisbane - Gold Coast - Sunshine Coast region was undertaken in August, 1989. However, one wholesaler (Columbus Imports) from Sydney, New South Wales, was interviewed by phone and the results are also included in this report. This wholesaler is possibly the largest shell wholesaler in Australia and supplies shells Australia-wide including to the Brisbane Gold Coast - Sunshine coast region. The survey area ranged from Noosa Heads 120 kms north of Brisbane on the Sunshine Coast, south to Tweed Heads at the edge of the Gold Coast. Map 1 indicates the general location of the survey area.





Map 1: Map showing general area of survey in Sunshine Coast – Brisbane – Gold Coast region.

The population of the Brisbane - Gold Coast - Sunshine Coast region is approximately 1.5 million and it is a major tourist area receiving more tourists, including international tourists, than any other region of Queensland. The beaches of the Gold Coast and the Sunshine Coast are an important attraction of the area. Amongst other things, it was hoped as a result of the survey to establish the extent to which tourists, both domestic and foreign, have an interest in purchasing giant clam shells.

We attempted to survey all establishments marketing clam shells in the region. Using the 'Yellow Pages' (Trade Directory) of the appropriate telephone directories as an initial source

of information, we contacted all establishments by telephone that might be selling clam shells. Once it was determined that an outlet was or had been selling clam shells, arrangements were made for a direct interview.

There were fifteen outlets in the survey. Of these establishments, three were wholesalers, one was both a wholesaler and a retailer, and eleven were engaged in the retail trade. Appendix B gives a list of the respondents, their addresses and indicates whether they are in the wholesale or retail trade. All respondents except one were currently selling giant clam shells or products made from them. The retail outlet which was not selling clam shells had sold them in the past but had discontinued sales because of a shortage of space in the shop. The shop did not intend to sell clam shells again in the future even though the shop received a number of enquiries from customers.

2. Varieties of Clam Shells Sold, Sizes and Uses, Market Segmentation.

By far the most commonly traded shell was that of *Hippopus hippopus* (the horse-shoe clam). Every outlet in our survey stocked shells from this species as can be seen from Table 1. In her survey of the Queensland market for shells undertaken in 1985-1986 Herbert (1986, p. 57) found that *H. hippopus* accounted for the lion's share of sales of giant clam shells in Queensland. While both demand and supply determine the actual proportions of sales of various types of shells, *H. hippopus* has a number of characteristics which make it very suitable for meeting a significant segment of demand. It has an attractive clean shell which is usually sparkling white with symmetric decorative reddish markings on the outside of the shell. It has a generous bowl-like cavity and can be machined on the outside so that it stands firmly as a bowl. It is quite sturdy and can be used in conventional and microwave ovens. The preferred size for this species appears to be 6- 8 inches (15- 20 cms) because it is widely used for ashtrays, soap holders, general purpose holders and in *mournay* sets for *entrees*. The available sizes of shells for this species in outlets ranged from 4 to 14 inches (10 - 35 cms).

Table 1: Number of outlets selling Giant Clam Shells by species. Features of Shells and most popular sizes of shells

Species	Most popular size	Features	Number of outlets selling*
<i>Hippopus hippopus</i>	6" – 8"	Versatile (ash tray, soap holder, entrée and mournay sets); attractive markings on back of shell; not easy to break	14
<i>Tridacna squamosal</i>	6" – 10"	Attractive appearance (with fingernails); used in bathroom or for decorative purposes	7
<i>Hippopus porcellanus</i>	10" – 12"	Attractive appearance; resembles china (decorative)	4
<i>Tridacna gigas</i>	The larger the better	Landscaping and interior design use	3
<i>Tridacna crocea</i>	-	-	5
<i>Tridacna maxima</i>	-	-	1
<i>Tridacna derasa</i>	-	-	0

* Total number of outlets selling clam shells- 14

There appears to be a reasonably strong demand for *H. hippopus* shells. Their sales volume was relatively large even when other types of clam shells were not in as short supply as currently is the case. They combine utilitarian characteristics with aesthetic appeal.

The second most widely sold type of shell is that from *Tridacna squamosa*. Seven of the fourteen outlets (the number still selling clam shells) sold shells from this species which is commonly called the fingernail clam. While the shell is usually of a dull ivory-white colour, it also comes in attractive colours ranging from yellow or orange to pink and can have a ceramic-like sheen. These attractive colours and the shell's unusual form make it appealing as a decorative item. It is mainly used for this purpose and as a soap- holder. It is not as sturdy as *H. hippopus* and if it is roughly handled the fingers are inclined to break off. The sizes of shells on sale were in the 4- 12 inch (10- 30 cms) range. Because of its decorative nature and the fact that it is usually used as an ornament within the house, even the smaller sizes seem to be in demand.

While *Tridacna crocea* shells ranging in size from 3 to 4 inches (8 - 10 cms) were available in five souvenir shops, there does not appear to be a great demand for them because they are small, have little utilitarian value and the outside of the shell is generally rough and concrete-like in appearance because they are usually prised from their substrata. This species, which is popularly called the burrowing clam, is still relatively abundant.

Four souvenir shops were selling *Hippopus porcellanus*, or at least claimed to be. This is rather unusual given that this species is the rarest of the clam species and appears to be on the verge of extinction in the wild. The available sizes appear to be in the 10 - 20 inch (25 - 50 cms) range. The shell of this species, which is popularly called the china clam, are thin and delicate (has the quality of thin china ware) which makes the item most attractive. They are almost translucent and the white colour in them is a pure white. This shell is subject to breakage and cannot be used in the same way as that of *H. hippopus*, e.g. for entrees. Nevertheless, because these shells have a very attractive appearance they tend to sell more rapidly than those of *H. hippopus* when both are available. One wholesaler (The Golden Cowrie) has been unable to obtain stocks of *H. porcellanus* shells for the last four years and believes that any available supplies are being sent to Japan for jewellery making.

Three souvenir shops had stocks of shells of *Tridacna gigas*, the largest of the clam species, although they were seen on sale only at one shop (Doug's Souvenirs) and ranged in size from 1 - 2 feet (30- 60 cms). They had been obtained several years ago with a shell consignment from the Philippines. The shells of *T. gigas* can be over one metre in size and are used both for indoor and outdoor decoration. The shells are whitish and sturdy and relatively smooth on the outside with regular conformation.

Larger *T. gigas* shells are in great demand but their supply is inadequate (has virtually dried up) due to eradication of much of the natural stock and the operation of the Convention on International Trade in Endangered Species (CITES). For example, the 'Big Shell' believed that it could sell about ten *T. gigas* shells a week if they were available.

The wholesalers W.W. Trading, Columbus Imports and The Golden Cowrie all indicated a large demand for big *T. gigas* shells and a shortage of supply. Mr Mcleod of The Golden Cowrie said there was a big demand for *T. gigas* by interior decorators and landscape designers.

While the owner of the 'From Down Under' shop said that he was selling *Tridacna maxima*

shells none were in the shop at the time of the visit and there did not seem to be a large quantity of sales of these.

Shells of the second largest of the clam species, *Tridacna derasa* were not sold by any of the outlets. The shells of this species are not very attractive. Their exterior is concrete-like in appearance, pitted and rough as a rule, and the inside is often off-white rather than pure white.

Thus it can be seen that the shells of only four species of giant clam, namely *H. hippopus*, *T. squamosa*, *H. porcellanus* and *T. gigas* seem to be in real demand for the shell trade. There appears to be little demand for the shells of *T. derasa*, *T. crocea* and *T. maxima*. The shells which are in demand have rather different uses. Shells of *T. squamosa* and *H. porcellanus* appear to be sought mainly as smaller indoor decorative items, whereas those of *T. gigas* are sought as larger indoor decorative items and for exterior landscapes. Shells of *H. hippopus* seem to have the most practical use and at the same time they are attractive in appearance.

The market for clam shells appears to be segmented. Small shells of *T. gigas*, because they are less beautiful, do not seem very substitutable with those of *H. hippopus*, *T. squamosa* and *H. porcellanus*. They do not appear to have as many practical uses as those of *H. hippopus*. Large *T. gigas* shells seem to have no close substitutes as decorative items.

Souvenir shops have tried to concentrate on the size range of clam shells which are most popular with consumers (see p. 7 of the questionnaire, Appendix A). For *H. hippopus* this appears to be 6- 8 inches., for *H. porcellanus* 6- 10 inches, for *T. squamosa* 6- 10 inches and for *T. gigas* sellers would like shells as large as possible. But unavailability of adequate supplies, except for *H. hippopus*, appeared to be a problem for maintaining their range.

3. Prices

From the survey, wholesale and retail prices of shells being traded in August, 1989 were obtained. The market was small for shells of all species other than *H. hippopus*. The unweighted average prices wholesale and retail for *H. hippopus* shells are shown in Table 2 and graphed on Figure 1. These prices are average prices per outlet trading in these shells. Actual prices, indicating extent of price variation between establishments, are shown in Figures 3 and 4 together with the graph of the average prices.

Table 2: Average retail and wholesale price according to size of *Hippopus hippopus* shells

Average Price in Australian Dollars					
Size	4" – 6"	6" – 8"	8" – 10"	10" – 12"	12" – 14"
Wholesale	0.59	1.55	3.40	0.00	3.98
No of Observations	4	9	4	0	1
Retail	2.04	3.22	9.32	14.50	23.31
No. of Observations	5	11	3	1	3

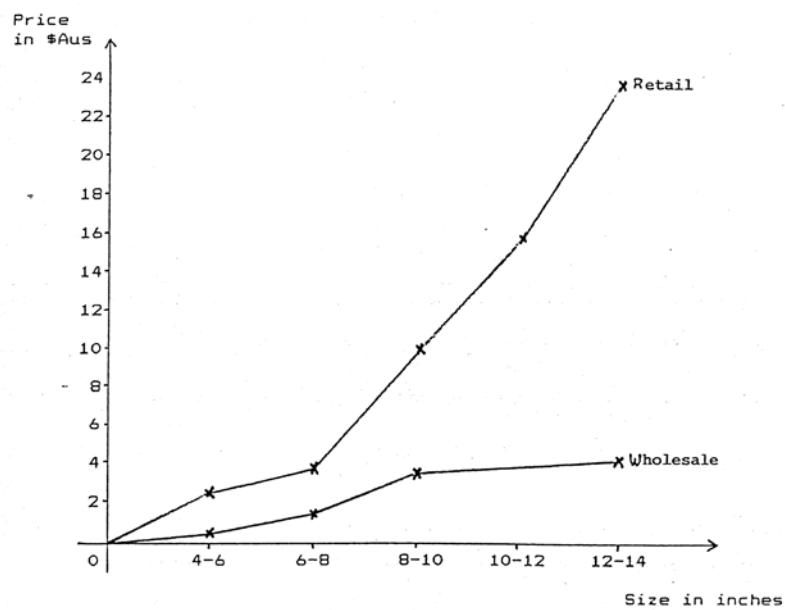


Figure 1: Graph of average retail and wholesale prices of *Hippopus hippopus* shells according to size as at August 1989.

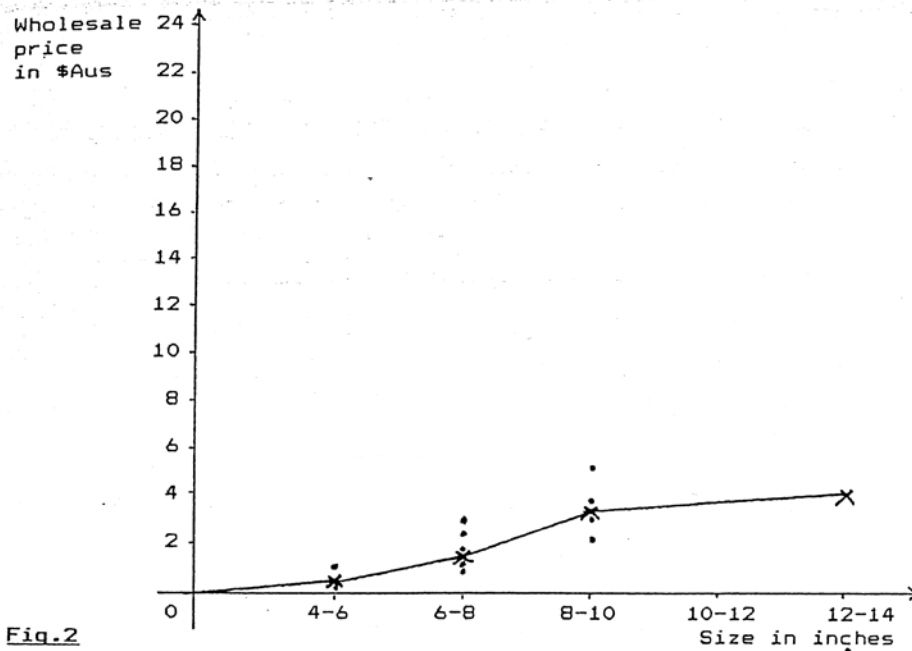


Fig. 2

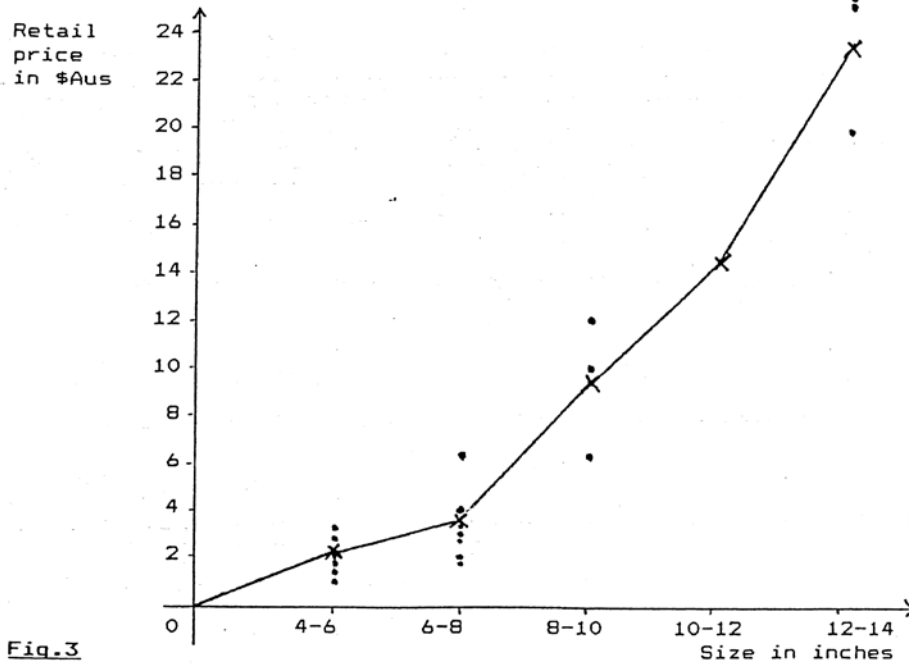


Fig. 3

Figures 2.and 3 Actual observations from each outlet selling *Hippopus hippopus* Shells and average retail and wholesale prices

In the most frequently traded size range (6"- 8"), the average retail price for *H. hippopus* shells was \$3.22 and wholesale \$1 .55. The retail margin was a little over 100 per cent. The margins for other sizes were higher. Primary suppliers of shells could expect to receive less than the wholesale price.

Prices for *H. porcellanus* shells are higher on average than for *H. hippopus*. From the sketchy information available from our survey, the wholesale price of *H. porcellanus* shells in the 8" - 10" range appears to be about 4 - 5 times higher than that for *H. hippopus* (see Appendix C for details of prices). Whereas the shells of most clam species are traded as half-shells, the shell of *T. squamosa* are usually traded as complete shells (that is as paired shells). Paired shells of this species of 6" size were available wholesale at \$2.50 per pair. On a half-shell basis, these shells were therefore just a little less expensive than *H. hippopus* of a similar size. Virtually no trade occurred in *T. gigas* shells but one retailer quoted \$39.95 for a 2ft. shell and about \$80 for the largest sized shells (3-4ft).

Despite the worldwide shortage of stocks of giant clam shells, most respondents suggested that prices had been relatively stationary in the last few years. However, one wholesaler (W.W. Trading Company) said that prices had risen in real terms by 40 per cent in the last 10 years and one retailer (Savoy Souvenirs) said that giant clam shells had gone up considerably in price in the last year.

As for whether the price of clam shells is sensitive to supply (Question 18 of survey), the results from the survey were inconclusive. While slightly more respondents answering this question believed the price to be sensitive to supply (5), almost as many thought otherwise (4) and there were a large number of respondents who did not answer this question (6).

Question 9 was designed to provide evidence on the responsiveness of price to variation in supply of clam shells. Overall, it emerged that price was relatively inelastic in relation to supply (which means that demand is relatively elastic in relation to price). Most respondents thought that up to a doubling of supply of clam shells would lead to a reduction in price of clam shells by less than one half. Eight respondents thought this to be so. One respondent had the opposite opinion and six did not answer this question. If the majority view is correct, an increase in supplies of clam shells, although it will lead to some reduction in price, will lead to a rise in total revenue. Many respondents believed that up to a 20 per cent increase in supply of clam shells would make no difference to prices. It seems that the market for shells may not be as limited as one might initially imagine. Demand at least seems to be rather elastic in the current price range.

4. Quantities Sold of Shells, Sources and Availability of Supply

The wholesalers in the sample were not very specific about the quantity of their sales of clam shells. One said many thousands were sold by him, another sold 3000 - 4000; another said not so many now were sold as in the past and another said several hundred were being sold. **Together they indicated that they could sell over 100,000 clam shells per year in the Australian market if they were available.** The retail outlets in this sample together sell approximately 15,000- 21,000 clam shells per year and earn in the order of \$40,000- \$55,000 in total revenue from clam shells (see Table 3).

Table 3: Approximate quantities of clam shells sold. Revenue from sales and quantities of clam shells that could be sold by establishments.

Establishment	Approx. quantity sold	Approx. Revenue	Quantity could sell
1. Wholesaler	Many 1,000's	-	Maybe 50,000
2. Wholesaler	3,000 – 4,000	\$6,000 - \$8,000	Larger quantity
3. Wholesaler	Not many now	-	Tens of thousands
4. Wholesaler & Retailer	Several hundred	-	Possibly 20,000
5. Retailer	2,000 – 3,000	\$4,000 - \$6,000	-
6. Retailer	300	\$1,050	-
7. Retailer	1,800	\$6,000	-
8. Retailer	10,000 – 15,000	\$20,000 - \$32,000	-
9. Retailer	1,000	\$2,500	-
10. Retailer	50	\$1,200	-
11. Retailer	200+	\$600 - \$700	-
12. Retailer	150 – 200	\$600 - \$800	-
13. Retailer	500 – 700	\$3,000 – \$4,000	-
14. Retailer	A few hundred	-	-

Virtually all clam shells entering the Australian trade in this region were imported from the Philippines. This was also the case in 1985-1986 (Herbert, 1986). Herbert found that about 86 per cent of shells sold in Australia were imported in 1985-86, mostly from the Philippines.

Approximately 5 respondents indicated giant clam shells to be in short supply and 6 said that

this was not so but the answer of one of the 6 was qualified by saying that larger shells are now in short supply. Overall answers to questions 11 and 21 indicate that larger clam shells and those of *T. gigas* are now in increasingly short supply. Answers to Question 21 indicate that many outlets find available supplies of larger clam shells to have dwindled and shells of *T. gigas* to be difficult (almost impossible) to obtain. In part, this is consistent with a pattern of overharvesting of natural stocks and the changing of composition (distribution) of the natural stock as harvesting pressures on it reduces populations. It is evidence of the precarious position of natural stocks. Apart from the actual natural scarcity of *T. gigas* due to depletion, CITES seems to be having some effect in limiting trade in its shells.

Some of the comments on Question 21 were as follows:

“Clam shells are getting more expensive and harder to get. The larger ones are no longer available. We used to sell more smaller ones when they were very cheap - 99c.” (Savoy Souvenirs)

“Clam shells are getting harder to get especially good quality ones. Our range of clam shells has changed because we cannot get big ones.” (The Big Shell)

5. Type of Customer Purchasing Giant Clam Shells

The type of customer purchasing clam shells varied somewhat by the location of the retail souvenir shop. Overall, however, tourists, mostly Australian tourists, accounted for more than half of sales by value but there were also a surprisingly large proportion of clam shells purchased by local householders.

One of the largest retailers of clam shells (Savoy at the Gold Coast) said that most of its sales of clam shells were to tourists and restaurants. It estimated that 80 per cent by value were to tourists, but of this only 5 per cent were to overseas tourists because clam shells were considered too heavy to carry e.g. by plane. The “Big Shell” at the Sunshine Coast reported a similar pattern of purchases with 90 per cent of sales to tourists and 10 per cent to overseas visitors and said that this was low because of the weight problem. It was said that “Germans love shells” and were amongst the main overseas customers. “Doug’s Souvenirs” reported 80 - 90 per cent of its clam shells being sold to tourists with only 20 per cent being sold to overseas tourists (mainly New Zealanders) because they are too heavy. Seaworld reported

that most of its sales were to Australian tourists with a small proportion being sold to overseas visitors, with New Zealanders being the principal purchasers from overseas.

Curran's Corner (another major retailer of clam shells) located in Brisbane estimated that 50 per cent of its sales of clam shells were to tourists of which 20 per cent were from overseas. Similar percentages (but a lower percentage of sales to overseas visitors) were reported by Cotton Tree Souvenirs. 'From Down Under' and 'Wharf Souvenirs' estimated that only 30 per cent and 25 per cent of their sales were to tourists with a low percentage of them being to overseas tourists. Italians were prominent purchasers from Wharf souvenirs.

Jewels of the Sea, Stafford, Brisbane, reported that most of its sales were to local householders buying clam shells for use in their homes. Only 10 per cent of sales of clam shells were to tourists and of these, only 1 per cent were to overseas tourists.

The evidence suggests that more than half of clam shells retailed in the region are sold to tourists with the proportion being highest at beach resorts. Over 80 - 90 per cent of sales to tourists appear to be to domestic tourists. The low percentage of sales to foreign tourists seems to be on account of the weight of the shells. Sales of giant clam shells for local household use are surprisingly high.

6. Market Prospects for Giant Clam Shells obtained from Mariculture

Most outlets (11) said that they would be interested in selling clam shells from clam farms (Question 8). Two did not answer the question, one said 'No' without giving a reason, and the other saying 'No' had gone out of clam shells altogether and did not plan to begin selling them again. Two wholesalers saying 'Yes' said that they depended on the price of farmed shells being commercially acceptable. Two retailers saying 'Yes' added comments. One said it was interested especially in big shells and another stressed that there was a large demand amongst tourists for Australian products so clam shells from Australian farms would gain greater purchaser acceptance on this basis if identified¹. Clearly there is widespread interest among present sellers of giant clam shells in obtaining shells from mariculture.

Sellers of clam shells were asked (Question 16) "If clams are to be bred for their shells, which characteristics would you like to see breeders concentrate on from the point of view of

¹ Japanese tourists, for example, might find these to be suitable *omiyage*.

obtaining sales?” Answers received were as follows:

1. Ensure good clean shells. Unless they are white inside they will not sell. In *T. gigas* try to breed for prominent ‘teeth’ and grow shell to at least 10 inches in size.
2. Like to see *H. hippopus* (*H. maculatus*) grown.
3. Shells should have a lack of encrustation. Surface should be smooth. Inside they should be pure white because people eat from them and this colour gives an impression of cleanliness and purity.
4. Bigger clams would be better.
5. Attractive colours and patterns, with pleasing texture and white inside.
6. Nice and white. While shells of the china clam are very popular, they are thin and can break more easily than those of *H. hippopus* which are much stronger.
7. Larger shells.
8. Larger shells without imperfections.
9. Good clean shells. China clam shells.
10. The whiter they are the better. China clams sell well because they are thin and delicate and white.
11. Breed for attractive patterns on the outside. Pairs are very popular and it would be excellent if large sized shells could be grown in a short period.

From the above it is clear that whiteness, especially on the inside of shells, is an important characteristic and encrustations and surface imperfections should be absent. *H. hippopus*, *H. procellanus* and large-sized *T. gigas* were mentioned as species where cultured shells would fill a market need. In general, outlets were hoping to obtain larger sized clam shells from farms because it is here that an immediate gap exists in the market.

In question 20, outlets were asked whether they consider there to be good prospects for expanding the demand for clam shells, especially from clam farms. Answers were mostly related to the market prospects of shells from farms and were as follows:

1. Yes, good prospects, especially for big shells.
2. Yes, because stocks are running low.
3. Yes, with clam meat being used in Japan and Australia as well.
4. The largest Australian wholesaler of shells said: Possibly, provided there is a regular supply of about 50,000 shells per year. At present clam shells come from Third World countries where labour costs are low and the price of clam shells is also low.
5. Yes, provided farming can extend the range of clam shells available.
6. Yes, especially if advertising is used to expand demand. Clam shells will always be popular.
7. Yes.
8. Yes, since a strong demand for clam shells.
9. Yes.
10. Yes. Good market for shells. Australian firms should consider exports. Within Australia, Australian cultured clams can reduce clam shell imports, especially from the Philippines.
11. Yes. This large wholesaler said he could sell tens of thousands of extra clams if they happened to be available.

Two respondents said No. One added, “unless someone thinks of a good idea for using them” and the other said “Maybe an expansion of 30 - 40% in Australian supplies of shells from farms would have good prospects. But beyond this the Australian market would be too small to absorb the extra supply”. The remainder of respondents did not answer this question. In general, sellers of shells seem to think that there are good prospects for selling clam shells obtained from mariculture.

Respondents were also asked if they wished to make any general comments about the economics of possibly farming giant clams for their shells. The following comments were received:

1. Supplies of shells should be available at stable and consistent prices and **continuity** of supply is important.
2. Economic success of farming will depend upon finding a market for the clam meat.
3. The Australian market is too small to support farming. Need exports to U.S. and Europe.
4. Farming has potential if it can supply a greater range of types of clam shells than those now available.
5. Must sell at a competitive price with supplies from natural sources. Prospects for sale in Australia better if product identified as Australian.
6. Prices should be reasonable.
7. Very big shells will find a ready market.

7. Discussion

Supplies of clam shells are clearly becoming shorter as evidenced by the lack of availability of larger-sized shells, increased reliance on lower grades of shells and the absolute shortage of *T. gigas* shells and those of *H. procellanus*. As CITES becomes more rigorously enforced and existing stocks of clam shells held by wholesalers and retailers dwindle the shortage will become more evident because no new stocks can legally be imported. It would seem therefore that this would leave a potential market in Australia for about 100,000 clam shells per year, the bulk of which is currently filled by shells of *H. hippopus* (*horse-shoe clams*). There is a potential for Australian giant clam farms to fill this gap. However, at present preferences are for larger-sized shells but these still take longer to grow and are more costly to produce. But the gap is probably larger than 100,000 for apart from wholesalers, some retailers import clam shells directly from the Philippines. Nevertheless it probably does not exceed 120,000 per year, and could be met by a few (2 or 3?) clam farms.

The quantity of annual sales of shells in Australia might be extended beyond the 120,000 per year mark by advertising and promotion. Also attention needs to be directed to creating greater demand for smaller sized shells in order to obtain greater sales to overseas travellers who do not purchase larger sized shells because of weight problems. There would seem to be

scope for marketing smaller shells as Australian identified products associated with the Great Barrier Reef. Brightly coloured small giant clams from *T. squamosa* are often purchased by overseas tourists in the Philippines.

Whether or not the shell will be a marketable by-product for clam farms will depend upon whether clam meat is marketed in the shell or separated from the shell and say chilled. In the latter case, the shells would be available as a by- product. However, it may conceivably be economic to grow some types of clams for the value of their shells alone. This will be examined in a later paper.

8. Acknowledgements

I would like to thank René Wittenberg for his research assistance and enthusiasm for this project.

9. Reference

Herbert, Kylie A. (1986) The Economic Characteristics and Significance of the Great Barrier Reef Region Shell Trade. Unpublished dissertation presented as a part requirement for the degree of Bachelor of Science (Honours) in the School of Australian Environmental Studies, Griffith University, Nathan, Brisbane.

APPENDIX A

CONFIDENTIAL

August, 1989.

SURVEY OF SOUVENIR SHOPS RE DEMAND FOR CLAM SHELLS AND PRODUCTS MADE FROM GIANT CLAM SHELLS

1. Name, address and telephone number of outlet

.....
.....
.....

2. *Do you sell shells of Pacific Giant Clams or products made from their shells?

Yes

No

If Yes go to question 5

If No go to question 3

3. Have you sold Pacific Giant Clams in the past or products made from them?

Yes

No

If Yes to question 3, why have you discontinued selling them?

If No to question 3, did you have a special reason for not including them in your stock?

4. Would you be interested in possibly selling Pacific Giant Clam shells in the future, for example from farmed stock?

Yes

No

* Please circle correct answers

5. What range of clam shells do you sell?

.....
.....
.....

6. From where do you get your stock?

.....

7. Why have you concentrated on the particular range which you now sell?

.....
.....
.....

8. Would you be interested in the possibility of selling clam shells from farms?

Yes

No

9. What prices are you charging for your clam shells? (Please specify by size, type and quality to extent possible.)

.....
.....
.....

10. How much are clam shells costing wholesale these days? (please specify by size, type and quality to extent possible)

.....
.....
.....

11. Do you consider shells to be in short supply at present?

Yes

No

12. Farmed shells could well be in the smaller size range (3" - 5"; 5" - 7"; 9"). Would you please comment on the extent of demand in these price ranges? For example, would you agree that there is little demand for shells in the 3" - 5" range or in these smaller size ranges?

.....
.....
.....

13. Could you please give some indication of the type of customer who buys clam shells? For example, are they mostly tourists?

.....
.....

14. What percentage of your sales (by value) are, in your view, made to tourists and visitors to your area?

.....%

15. What percentage of your sales (by value) would, in your view, be made to overseas visitors?

.....%

16. If clams are to be bred for their shells, which characteristics would you like to see breeders concentrate on from the point of view of obtaining sales?

.....
.....
.....

17. Has the price of clamshells risen in recent times? Could you give some indication of the price change?

.....
.....

18. Do you feel that the market price for shells of clams is likely to be very sensitive to changes in the available supply?

Yes

No

19. Please complete the following: I expect:

(a) A 20% increase in clam shell supplies to reduce the current price of clam shells

- by 20%
- by less than 20%
- by more than 20%

(b) A doubling of supply of clam shells to reduce their current price

- by a half
- by less than a half
- by more than a half

(c) A fivefold increase in the supply of clam shells to reduce their price

- to one-fifth of current price
- to a lower price than this _
- to a price not as low as one-fifth of the current price.

20. Do you consider there are good prospects for expanding the demand for clam shells, especially from clam farms?

Yes

No

Please elaborate

.....
.....
.....

21. How has the range of shells which you offer changed in recent years? If the range has changed please give reasons for the change.

.....
.....
.....
.....

22. Do you sell any products manufactured from giant clam shells?

Yes

No

If Yes, please list

.....
.....

23. Are you finding it increasingly difficult to obtain products made from giant clam shells?

Yes

No

Please comment

.....
.....
.....
.....

24. What products made from giant clam shells are in particular demand?

.....
.....

25. Approximately how many clam shells do you sell per year?

.....

What would approximately be the value of your revenue from these?

\$.....

26. Are there any general points that you feel should be made about the economics of possibly farming giant clams for sale for their shells?

.....
.....
.....

27. Would you like a complimentary copy of the report on this survey?

Yes

No

Thank you for your co-operation,

Clem Tisdell,
Department of Economics,
University of Queensland,
St Lucia, 4067.

Tel. (07)377-2049

APPENDIX B

List of Responding Retailers and Wholesalers of Giant Clam Shells

Respondent	Status
Arunga Souvenirs Brisbane Arcade, BRISBANE	Retailer (no longer selling clam shells)
Columbus Imports Pty. Ltd NORTH BRIDGE NSW	Wholesaler
Cotton Tree Tourist Centre King Street, MAROOCHYDORE	Retailer
Curran's Corner Cnr Edward & Adelaide Sts. BRISBANE	Retailer
Doug's Souvenirs 17 Cavill Avenue, SURFERS' PARADISE	Retailer
From Down Under Sunshine Beach Road, NOOSA JUNCTION	Retailer
Jewels of the Sea 400 Stafford Road, STAFFORD 4063	Retailer
David and Roslyn Paterson 6 Warra court, MUDGEERABA 4123	Wholesaler
Savoy Souvenirs (House of Shells) 3143 Gold Coast Highway	Retailer
Seaworld Seaworld Drive, Main Beach, SURFERS' PARADISE	Retailer
Sunshine Plantation Woombye, SUNSHINE COAST	Retailer
The Big Shell TEWANTIN	Retailer
The Golden Cowrie 127 Griffith Street, COOLANGATTA, 4225	Wholesaler and Retailer
Wharf Souvenirs Seaworld Drive, Main Beach, SURFERS PARADISE	Retailer
WW Trading Company 5 Aldinga Road, STRATHPINE	Wholesaler

APPENDIX C

Table of Giant Clam Prices as Notified by Respondent Wholesalers and Retailers

Species	Wholesale				Retail				Outlet
<u>Tridacna squamosa</u>									David Paterson
					6" - 10"				Sunshine Plantation
						6"			Cotton Tree Tourist Centre
									From Down Under
						6"			The Big Shell
									The Golden Cowrie
									Doug's Souvenirs
<u>Tridacna gigas</u>								24"	Seaworld
								\$ 3995	
								2 feet	Doug's Souvenirs
							\$ 75 ⁰⁰ - 80 ⁰⁰		
							4 feet	From Down Under	
							\$ 2		
<u>Tridacna crocea</u>					3"				Sunshine Plantation
									Cotton Tree Tourist Centre
									From Down Under
						4"			The Big Shell
					\$ 250				
<u>Tridacna maxima</u>								8" - 12"	From Down Under
								\$ 2	

Species	Wholesale						Retail						Outlet
	4"-6"	6"-8"	8"-10"	10"-12"	1foot	<	4"-6"	6"-8"	8"-10"	10"-12"	1foot	<	
Hippopus Hippopus		6" \$1.50 7" \$2.00	9" \$3.50										David Paterson (Wholesaler)
							\$2.95						Seaworld
							\$2.50	\$3.50	\$9.95		\$18.95		Sunshine Plantation
	\$1.00 (tooth-picks)	\$2.00					\$1.50 (with tooth-picks)	\$3.50 2 for \$5.00					Cotton Tree Tourist Centre
		\$1.57	\$2.08		15"-14" \$3.98			\$3.50	\$12.00		12"-14" \$25.00		From Down Under
	\$0.36-2.00						\$1.75	\$5.95		12" \$14.50			The Big Shell
		\$2.00/Kg											The Golden Cowrie (W'saler/Retailer)
	\$0.50		\$5.00										Columbus Imports (Wholesaler)
	changes with		\$ Aus					\$2.99					W.W. Trading Co. (Wholesaler)
								\$2.50					Doug's Souvenirs
	3"-5"	5"-7"	7"-8"				3"-5" \$1.00	5"-7" \$2.00	7"-8" \$3.00 \$6.00				Jewels of the Sea
		6"						6" \$1.99					Curran's Corner
	5"-6"	6"-8"			12"		5"-6" \$1.99	6"-8" \$2.99			12" \$25.99		Savoy Souvenirs
		6"						6" \$3.50					Wharf Souvenirs
Hippopus arcellanus		6" \$2.00	9" \$6.50 10" \$8.50										David Paterson
													Seaworld
	\$1.00-	\$1.80/Kg								12" \$14.50			The Big Shell
					20" \$17.50						20" \$35.00		Jewels of the Sea

Research Reports and Papers in: Economics of Giant Clam Mariculture

Previous Working Papers

1. "Market for Giant Clam Shells: Report on a Survey of Retailers and Wholesalers in Southeast Queensland, Australia." Clem Tisdell with the assistance of Rene Wittenberg, November, 1989.
2. "Seafarming as a Part of Indonesia's Economic Development Strategy - Seaweed and Giant Clam Mariculture as Cases." Carunia Firdausy and Clem Tisdell, November, 1989.
3. "Market for Giant Clams as Aquarium Specimens: Report on a Survey of Retailers of Supplies for Saltwater Aquariums, Southeast Queensland, Australia." Clem Tisdell with the assistance of Rene Wittenberg, November, 1989.
4. "Aquaculture as a Use of the Coastal Zone: Environmental and Economic Aspects, Giant Clam Farming as a Development." Clem Tisdell, December, 1989.
5. "Pacific Giant Clams and their Products: An Overview of Demand and Supply Factors." Clem Tisdell, December, 1989.
6. "Marine Property Rights in Relation to Giant Clam Mariculture in the Kingdom of Tonga." Dr T'eo I.J. Fairbairn, February, 1990.
7. "Exploring the Demand for Farmed Giant Clams and Their Components: Approaches and Problems." Clem Tisdell, February, 1990.
8. "Report on possible Demand for Giant Clam Meat by Tongan Descendants in Australia: Inferences from interviews conducted in the Brisbane Area". Clem Tisdell and Rene Wittenberg, February, 1990.
9. "Evaluation of International Trade Statistics on Giant Clams and Related Products and the Market for Giant Clam Meat." Dr John Stanton, March, 1990.
10. "Assessing Species for Mariculture in Developing Countries: A Review of Economic Considerations." Carunia Firdausy and Clem Tisdell, April, 1990.
11. "An Analysis of the Cost of Producing Giant Clam (*Tridacna gigas*) Seed in Australia." Tisdell, C.A., Lucas, J.S. and Thomas, W.R., May, 1990.
12. "Marine Property Rights Fiji: Implications for the Development of Giant Clam Mariculture." Dr T'eo I.J. Fairbairn, August, 1990.
13. "Reef and Lagoon Tenure in the Republic of Vanuatu and Prospects for Mariculture Development". Dr T'eo I.J. Fairbairn, August, 1990.
14. Progress Report No. 1 to ACIAR, Project No. 8823. Professor Clem Tisdell, August, 1990.
15. "The Potential Market for Giant Clam Meat in New Zealand: Results of Interviews with Pacific Island Immigrants." Clem Tisdell and Rene Wittenberg, October, 1990.
16. "The Potential Demand for Giant Clams in Indonesia and Their Status: A Report on a Survey of Four Coastal Villages in Bali and Java." Carunia Firdausy and Clem Tisdell, November, 1990.
17. "Traditional Reef and Lagoon Tenure in Western Samoa and Its Implications for Giant Clam Mariculture." Dr T'eo I.J. Fairbairn, February, 1991.
18. "Ocean Culture of Giant Clams (*Tridacna gigas*): An Economic Analysis." C.A. Tisdell, J.R. Barker, J.S. Lucas, L. Tacconi and W.R. Thomas, February, 1991.
19. "Aid for Village-Based Rural Projects in LDCs: Experiences, Project Appraisal and Selection, ACIAR and Giant Clam Culture as a Case". Luca Tacconi and Clem Tisdell, March, 1991.
20. "Customary Marine Tenure in the South Pacific Region and Implications for Giant Clam Mariculture". Dr T'eo I.J. Fairbairn, April, 1991.
21. "ACIAR-Supported Research on the Culture of Giant Clams (*Tridacnidae*): A Multi-Faceted Economic Assessment of Research Benefits (Draft Appraisal)". Professor Clem Tisdell, April, 1991.
22. "Economics of Ocean Culture of Giant Clams: Internal Rate of Return Analysis for *Tridacna gigas*". Tisdell, C.A., Tacconi, L., Barker, J.R. and Lucas, J.S., April, 1991.
23. "Socio-Economic Aspects of Giant Clams in The Lau Group, Fiji, and Farming Prospects: Results of Field Research". Veikila Vuki, Clem Tisdell and Luca Tacconi, June, 1991.

24. "Subsistence Economic Activities and Prospects for Clam Farming in Ono-i-Lau, Fiji: Socio-Economic Factors". Veikila Vuki, Clem Tisdell and Luca Tacconi, June, 1991.
25. "Giant Clams in Tuvalu: Prospects for Development". Luca Tacconi and Clem Tisdell, July, 1991.
26. "A Report on the Test Marketing of Giant Clams as Aquarium Specimens in Brisbane, Australia". Clem Tisdell, November, 1991.
27. "Economic Returns from Farming Different Types of Seaweed (Eucheuma) and for Farms of sizes in Nusa Penida, Bali, Indonesia." Carunia Mulya Firdausy and Clem Tisdell, December 1991.
28. "The Market for Giant Clams as Aquarium Specimens in Sydney and Melbourne: Results of a Telephone Survey of Retail Outlets." Clem Tisdell and Thea Vinnicombe, January 1992.
29. "Domestic Markets and Demand for Giant Clam Meat in the South Pacific islands - Fiji, Tonga and Western Samoa". Luca Tacconi and Clem Tisdell, January 1992.
30. Economics of Giant Clam Production in the South Pacific - Fiji, Tonga and Western Samoa". Luca Tacconi and Clem Tisdell, February 1992.
31. "Exports and Export Markets for Giant Clam Products in the South Pacific: Fiji, Tonga and Western Samoa". Luca Tacconi and Clem Tisdell, March 1992.
32. "Institutional Factors and Giant Clam Culture and Conservation in the South Pacific: Observations from Fiji, Tonga and Western Samoa". Luca Tacconi and Clem Tisdell, March 1992.
33. "Giant Clams in Wallis: Prospects for Development". Nancy J. Pollock, May 1992.
34. "Current and Potential Markets for Giant Clam Meat in Fiji - A Case Study of the Market in Suva". Vina Ram, August, 1992.
35. "Interest of Asian Restaurants in Queensland in Using Giant Clam Meat in their Cuisine and Their Knowledge of It." Clem Tisdell, September, 1992.
36. "Notes on the Use of Giant Clam Meat for Food in Taiwan". Clem Tisdell and Cheng Ho Chen, October 1992.
37. "Interest of Japanese Restaurants in Brisbane in Using Giant Clam Meat in their Cuisine and their Knowledge of It". Clem Tisdell and Yoshihiro Kuronuma. November, 1992.
38. "Business Strategies for Commercial Giant Clam Growing". Clem Tisdell and Jeremy Barker, December, 1992.
39. "Giant Clams in Japanese Cuisine - Brisbane Trials and Use in the Ryukyus". Clem Tisdell and Yoshihiro Kuronuma, December, 1992.
40. "Final Report and ACIAR Project No. 8823 (ROU 259) 'Economics of Giant Clam (Tridacnid) Mariculture". Clem Tisdell, March, 1993.