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# PROCEEDINGS OF THE REGIONAL WORKSHOP ON SEAWEED CULTURE AND MARKETING

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# PROSPECTS FOR EUCHEUMA MARKETING IN THE WORLD AND THE FUTURE OF SEAWEED FARMING IN THE PACIFIC

by

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## Present Market and Future Prospects for Eucheuma

An earlier market study of Eucheuma was made in July 1987 (McHugh and Philipson, 1989). At that time there was an oversupply and prices were falling. Indonesian Eucheuma cottonii had an f.o.b.[1] price of US$ 265 per mt and it was estimated that this could possibly fall to as low as US$ 200, a figure which represented the lowest return for which farmers were likely to continue to produce. The corresponding c.f.[2] price, Europe, was US$ 355 per mt.

A survey of some of the major seaweed buyers in October 1989 showed that a dramatic reversal of the situation has occurred. Demand now exceeds the supply and the resulting shortage has led to a c.f. price, Europe, of US$ 700 per mt double that of mid-1987. By mid-November the price in Indonesia had risen to US$ 800 but there were few buyers at this price. The shortage of Eucheuma has occurred chiefly because of two factors, first a levelling off of production in the Philippines in 1988-89 (Table 1) and second, an increase in demand from carageenan manufacturers (Table 2).

Production in the Philippines did not increase for several reasons. Typhoons caused losses in northern producing areas around Cebu. The price of Manila hemp and copra increased so some farmers in the Tawi Tawi area turned to these. Some of the southern seaweed farmers moved to Sabah, a safer place to live, where good work is available.

The increase in demand for Eucheuma is due largely to a greater demand for the carrageenan which is extracted from these seaweeds. The growth in consumption of convenient foods and low-fat meat products in developed countries has opened up new markets for carrageenan. Chicken pieces cooked in a microwave oven can become dried out and stringy. Carrageenan can be injected into chicken pieces as a suspension in brine; when the chicken is cooked, particularly in a microwave oven, the carrageenan dissolves and forms a gel which helps to maintain moisture in the meat and to improve its texture. Delicatessen lines made from meat with a low fat content require a binder to hold the compressed meat loaf together and carrageenan is often effective for this purpose. Carrageenan demand is also linked with the increasing sales of anti-tartar toothpastes; these toothpastes have a higher content of salts which are incompatible with some toothpaste thickeners but are compatible with carrageenan.

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1. f.o.b. is free on board. It is the price offered on condition that the seller meets all costs until the goods are loaded on the ship at the port of export. The buyer meets all further costs.

2. c.f. is cost and freight. It is the price offered on condition that the seller meets all until the goods are delivered to the buyer's port. It includes the cost of freight from the seller's country to the buyer's country.

Table 1. Eucheuma cottonii production ( mt ), demand and price.

| | Actual | | | Predicted | |
|---|---|---|---|---|---|
| | 1987 | 1988 | 1989 | 1990 | 1991 |
| Production | | | | | |
| Philippines | 40,000 | 50,000 | 50,000 | 55,000 | 60,000 |
| Indonesia | 5,000 | 5,000 | 8,000 | 12,000 | 15,000 |
| Other | 250 | 250 | 350 | 500 | 700 |
| World Production | 42,250 | 55,250 | 58,350 | 67,500 | 75,700 |
| World Demand | 46,000 | 60,000 | 70,000 | 80,000 | 90,000 |
| Price, US$: | | | | | |
| c.f. Europe | 380 | 620 | 720 | 800 | 800 |
| c.f. USA | 440 | 680 | 780 | 870 | 870 |

Since the demand for Eucheuma is linked to that for carrageenan, prospects for the latter are discussed first. Table 2 shows that world production increased a little from 1988 to 1989 but most manufacturers are now operating their plants close to full capacity and several plan to expand in 1990. This should lead to an increased output of 10-15% for the next two years, with E. cottonii products at the higher end of this range. Meanwhile world demand is expected to continue to increase by about 10% per year for the next 3-4 years so it is doubtful that production will match demand before 1992. The actual output of new manufacturing facilities may be determined by the availability of Eucheuma raw material. The figures in the table are for carrageenan as sold to end-users; this usually contains other necessary additives which depend on the intended application. The amount of pure carrageenan (no additives) produced in 1989 is estimated to be about 11,000 mt.

Seaweed flour (formerly called semi-refined carrageenan) is also produced from Eucheuma and its production, demand and price are shown in Table 2. Production should continue to match demand, and demand is unlikely to increase very much unless new applications are found. The principal application is in the manufacture of canned petfoods and this market is dominated by one organization. The price has remained the same for the past two years and some producers are believed to be selling at a loss. As contracts are renewed it seems inevitable that some price rise must occur to compensate for the increased price of seaweed.

The trends in productions, demand and price of Eucheuma cottonii are shown in Table 1; the prices for the last three years are for October/November of each year. The Philippines and Indonesia are the major producers and are likely to remain so in the medium term. Production in the Philippines should increase by about 10% a year as some Tawi Tawi farmers return and others lift their productivity. However for any greater increase, new

farming areas would have to be developed. On the other hand, Indonesian production is increasing rapidly, with most farming in the Bali area; the predicted figures in Table 1 could be exceeded if prices remain high and Eucheuma farming is developed in other parts of the country. The figures for world demand in the table show the unbalance with supply which started to develop in the latter part of 1988; the present difference between supply and demand is expected to last at least until 1991. It is not feasible to try to predict beyond this point.

Table 2. Carrageenan and Seaweed Flour production ( mt ), demand and price.

| | Actual | | | Predicted | |
|---|---|---|---|---|---|
| | 1987 | 1988 | 1989 | 1990 | 1991 |
| Carrageenan | | | | | |
| World production | | 16,000 | 17,000 | 20,000 | 22,000 |
| World demand | | | 20,000 | 22,000 | 25,000 |
| Seaweed Flour | | | | | |
| World production | 5,800 | 6,300 | 7,000 | 7,500 | 7,500 |
| World demand | 5,800 | 6,300 | 7,000 | 7,500 | 7,500 |
| Price, US$ (per tonne) | 3,000 | 3,200 | 3,200 | 3,400 | 3,600 |

Eucheuma spinosum is a source of iota-carrageenan but the use for this is not as great as that of kappa-carrageenan, which is derived from Euchuema cottonii. Consequently the demand for E. spinosum, shown in Table 3, is not as great as that for E. cottonii. In the Philippines, E. spinosum has always been more difficult to grow than E. cottonii so farmers usually prefer to produce E. cottonii. In Indonesia, wild E. spinosum grows well in many parts of the country and around Bali it is cultivated as easily as E. cottonii. These differences are reflected in the production figures shown in Table 3. The production in the Philippines has been gradually declining since 1987 while Indonesian output has increased rapidly so that now it is about six times greater than the Philippines. Indonesian farming is expected to continue to expand, to fill the gap between world demand and the Philippines production. In the past the price of E. spinosum has usually been a little lower than that of E. cottonii so the predicted values in Table 3 reflect this, until about 1991. However unexpected surges in demand can cause price fluctuations; a past example has been the purchase of bleached E. spinosum for the food market in Hong Kong while at present large amounts are being shipped to China for unknown uses.

In summary, new uses for carrageenan have led to surge in market from 2-3% to about 10% a year. This in turn has led to a shortage of raw materials and the price of Eucheuma cottonii has doubled in the past eighteen months. This shortage is expected to continue for at least the next two years.

**Future for Seaweed farming in the Pacific**

With the present production from the Philippines (51,000 mt) and Indonesia (14,500 mt), the Pacific countries can only expect to be minor producers in the short to medium term future. They will therefore have to match the c.f. prices offered to the major producers. Two years ago, with c.f. prices for Europe at US$ 350, the only viable destination was New Zealand, because of freight costs. At current prices of US$ 700, it is possible to sell profitably to Europe, at least from some Pacific countries.

Table 3. Eucheuma spinosum production ( mt ), demand and price.

| | Actual | | | Predicted | |
|---|---|---|---|---|---|
| | 1987 | 1988 | 1989 | 1990 | 1991 |
| Production | | | | | |
| Philippines | 2,500 | 1,600 | 1,000 | 1,500 | 2,000 |
| Indonesia | 4,000 | 5,500 | 6,500 | 8,500 | 10,000 |
| Other | 50 | 50 | 100 | 150 | 200 |
| World Production | 6,550 | 7,150 | 7,600 | 10,150 | 12,200 |
| World Demand | 6,600 | 7,500 | 7,500 | 10,000 | 12,000 |
| Price, US$: | | | | | |
| c.f. Europe | 390 | 400 | 600 | 700 | 800 |
| c.f. USA | 450 | 460 | 660 | 770 | 870 |

Countries interested in undertaking seaweed farming, at any time, need to consider two questions:

- Is seaweed cultivation worthwhile at the current c.f. price?

- At what c.f. price would seaweed cultivation cease?

Both questions can be answered by using the following method to estimate costs and returns.

In the first question, "worthwhile" is something that has to be defined for each country, taking into account the cultures and attitudes of its potential seaweed farmers. Some may only be interested in working for short periods with small profits while others may see it as not worthwhile unless larger profits are possible, even if the working hours are longer. These ideas lead to the first monetary matter which should be considered.

A. What is the minimum acceptable income for which a seaweed farmer will work? Some factors which will affect this are:

- the minimum daily wage for the country;
- potential income from alternative occupations;
- the need/desire for money.

The minimum daily wages for some countries are shown in Table 4. It can be seen that the main Eucheuma producers, Philippines and Indonesia, have very low wages' while the figure for Palau is high, people in more remote areas of the country may find lower wages quite acceptable. Occupations such as fishing, copra cutting and farming are some of the alternatives available to seaweed farmers and experience in the Philippines has shown that they will move to these if the return from seaweed becomes too low. Subsistence farmers sometimes have little need for money and this may influence their decision about the minimum acceptable return from seaweed farming.

Table 4. Minimum daily wage for various countries (in USD).

| Country | Minimum daily wage (USD) |
|---|---|
| Fiji | 6 |
| Kiribati | 4 |
| Palau | 10 |
| Tonga | 5 |
| Tuvalu | 3 |
| Malaysia | 5 |
| Philippines | 2 |
| Indonesia | 1 |

B. What are the farming costs?

Other speakers in this workshop have already covered these costs and further examples have been given by Smith (1986). Initial investment costs may include seed plants, monoline/rope, stakes, floating frames, hand tools, baskets, boat, engine, drying racks, sometimes a farmhouse. Operating costs include tie-ties, gasoline, replacement of stakes, monoline or frames and maintenance of equipment such as the boat, engine, farmhouse etc. Obviously these costs will depend on the location of the farm and the farming method used. Sometimes some transport costs to the seaweed buyer also have to be borne by the farmer. These costs, and the minimum acceptable income, should be based on a "per tonne" basis; for example they could be estimated for a full year and divided by the tonnes of seaweed which are expected to be harvested annually.

A + B = farmgate price (minimum)

The addition of A and B needs to be at least equal to the farmgate price on offer for the seaweed. Since the calculation involves the minimum acceptable income, A + B must be the minimum farmgate price. When the price falls below this value, farming may cease.

The market chain for seaweed usually includes at least one trade/exporter who buys from the farmers and sells to the carrageenan producers. His costs need to be estimated.

C. What are the domestic costs?

This is the cost of transporting the seaweed from the farmer to the warehouse of the exporter, and later from there to the port of export. The methods of transport and the costs will vary considerably from country to country. In Fiji, some seaweed is transported by road from Raki Raki to Lautoka; near Bali it is taken by a small boat from Nusa Lembongan to Bali and later by road and ferry to Surabaya; in Kiribati, some must be transported by the country's shipping line from an outer island to Tarawa.

D. The trade/exporter must add the cost of:

- inspection, sorting and repacking into bales;
- losses of seaweed and moisture (called "shrinkage");
- overheads - power, depreciation on buildings and equipment etc.;
- interest on borrowed money;
- profit margin.

A + B + C + D = f.o.b. price required (minimum)

The addition of A, B, C, and D will equal the minimum f.o.b. price required for the farmer and trader/exporter to operate profitably. If the available f.o.b. price is less than this, then either the trader must operate at a lower profit or a loss, or he must lower his farm-gate price and run the risk of the farmer ceasing to farm.

To calculate the available f.o.b. price, Pacific countries need to take the c.f. price on offer to the major producers (Philippines and Indonesia) and subtract the freight costs from their Pacific country to the country specified in the c.f. price.

current c.f. price - freight = f.o.b. price available

A country can farm seaweed profitably at the current c.f. price, if the f.o.b. available is greater than the f.o.b. required.

The value of the f.o.b. available will be affected by the currency exchange rate of the country making the calculation. c.f. Prices are usually expressed in US dollars as are the rates for international freight. Therefore the calculated value of the f.o.b. available is usually in US dollars and must be converted to the domestic currency for comparison with the f.o.b. required. For example in Fiji, in early 1987 a difference of US$ 100 between the f.o.b. available and the f.o.b. required was equivalent to F$ 88 but after devaluation later in the year it was equivalent to F$ 125.

Finally, the need to pack and bale seaweed carefully is highlighted by the dependence of the available f.o.b. on freight costs. If freight from a Pacific country is US$ 3,000 per 20-foot container to Europe, then 20 mt of well packed seaweed will cost US$ 150 per mt. If only 15 mt of seaweed can be accommodated in the container, because it is too dry or otherwise too loosely packed, the cost will rise to US$ 200 per mt.. Careful drying and good baling equipment are essential for Pacific countries.

From the above considerations, it can be seen that if it is not possible to make predictions for the Pacific areas in general, each country must make its own estimates of costs and profitability. Costs will vary according to its geographical location, the farming

areas available, the farming methods used, the expectations of its farmers and the estimated size of the annual harvest. A pilot farm is highly desirable for reasonably accurate estimates to be made, particularly the annual yield of seaweed. Others in this workshop have already spoken of the variations in yield from one area to another. Profitability is largely dependent on future prices for seaweed. The price of Eucheuma has a history of fluctuations. Therefore like any other business enterprise, seaweed farming has its risks. Perhaps the seaweed farmer should be encouraged to try to diversify into other types of seaweed or to maintain other activities, such as fishing and farming, so that his risk is reduced should the price of Eucheuma fall.

**References**

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