

Pepper in the South Pacific : current market prospects and research

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Pepper is the subject of research efforts in Tonga, Vanuatu and Western Samoa. Its appeal as a smallholder crop is based on the appropriateness of small-scale production, relative labour intensiveness in a region of rural underemployment, simple processing, and storability. Much of the research has concentrated on establishing suitable supports for the vines. A number of indigenous trees are being evaluated with *Cyathea rugosula*, living coconut and breadfruit emerging as suitable candidates.

Smallholders have become a major focus of agricultural production in general¹ and in the South Pacific in particular.²

Spices are an integral part of that focus for several reasons. First, they are essentially suitable for small-scale production. Second, they are labour intensive in a region where there is considerable rural underemployment. Third, spices require relatively simple processing in order to attain a marketable form. Finally, once processed, spices can usually be kept for lengthy periods without expensive storage. In areas of the Pacific where shipping is a problem this feature is particularly valuable.

Pepper meets these broad criteria. It has the additional attraction of having a long harvest period which should yield a relatively regular cash flow. Pepper also appears to be suitable for intercropping with coconuts. Consequently, a number of island nations are exploring the potential for pepper production.

Pepper industry development in the South Pacific

Pepper is not a new crop to the South Pacific. Parham³ noted that Fiji exported pepper as early as 1888, although the crop later disappeared. However, unlike turmeric in Solomon Islands and ginger in Western Samoa, pepper does not appear to have become feral.

Despite its lengthy presence, pepper has not developed as a commercial crop: notwithstanding its pioneering status, Fiji did not proceed with the commercialization of the crop. Whilst Tonga has in place a pepper development scheme, actual introduction to smallholders appears to be lagging. Vanuatu's industry, whilst starting after Tonga's, has moved into the smallholder phase. Pepper development

1 J. Hirst, J. Overton, B. Allen and Y. Bryon (eds), *Small-scale Agriculture*, Canberra, Commonwealth Geographical Bureau and Department of Human Geography, Australian National University, 1988.

2 K. Menz (ed.), *Smallholder Agricultural Development in Tonga*, ACIAR Proceedings No. 24, Canberra, Australian Centre for International Agricultural Research, 1988.

3 B. Parham, 'Pepper', *Agricultural Journal (Fiji)*, 25(3), 1954.

officers have been designated and received further training in Pohnpei. The Information Service Branch at Tagabe has commenced smallholder extension field days.

International markets

Pepper production is highly concentrated, with Brazil, India, Indonesia, and Malaysia producing about 90 per cent of world production (Table 1). Pepper constitutes about 40 per cent of all spices traded, with the four major pepper producers dominating.

Table 1 Pepper production: major producers (tonnes)

Year	Malaysia	Indonesia	India	Brazil	Other producers ^a	Total
1970	26,078	17,219	25,000	14,267	18,115	100,460
1975	33,113	22,934	28,180	21,000	8,420	111,901
1980	31,460	31,500	27,700	40,628	3,969	136,847
1985	16,000	41,000	55,000	30,500	14,145	115,645
1986	15,500	37,000	40,000	25,300	12,188	129,988
1987	14,000	36,000	45,000	27,000	12,914	134,914

^aMadagascar, Sri Lanka, Thailand.

Source: Pepper Statistical Yearbook 1987.

An examination of the import statistics of 27 countries for the past 17 years⁴ reveals a number of factors which influence market prospects.

First, the spice trade is noted for its idiosyncratic nature with some spices being imported by only one or two countries. In contrast, pepper is imported by nearly every country. Second, the United States imports about a quarter of all pepper imports (Table 2). About 90 per cent of this is black pepper. Despite drawing its supplies from about thirty countries, the United States imports the bulk of its supplies from the major exporters: between 1978 and 1987, Malabar, Lampong and Brazil supplied not less than 86 per cent of black pepper imports. Third, United States imports have shown an annual growth of about five per cent. In contrast, the European Community, which, as a block, imports about the same volume as the United States, has shown

a growth of only two per cent per annum. Fourth, Western Europe prefers white to black pepper with white pepper from Muntok, Sarawak and Brazil constituting about 70 per cent of all pepper imports.

Table 2 Pepper imports: major countries (tonnes)

Country	1981	1982	1983	1984	1985	1986
United States	31,117	30,614	31,643	38,321	32,250	42,035
Germany	11,432	11,576	12,558	12,153	10,993	11,474
USSR	11,572	14,126	13,348	13,264	13,143	14,725
Singapore	16,841	16,125	14,465	9,144	14,478	12,576
France	8,286	7,736	8,189	7,643	7,907	7,924
Japan	5,186	4,658	5,144	5,212	5,707	5,566
Saudi Arabia	5,247	3,931	5,401	5,277	4,884	4,549
Netherlands	1,693	1,732	3,077	2,077	2,689	3,914
United Kingdom	3,874	4,500	4,815	6,031	5,404	4,341
Italy	2,548	2,778	3,031	3,164	3,123	3,275

Sources: ITC, 'Imports of spices into selected markets, 1981-85', International Trade Centre Report of the First Meeting of the International Spice Group, New Delhi, November 1986; ITC, 'Imports of Spices into selected markets', 1983-87', International Trade Centre Report of the Second Meeting of the International Spice Group, Singapore, March 1989.

In broad terms the international prospects for pepper are good. The continuing growth of the fast-food and convenience food sectors coupled with manufacturers' desire to differentiate their products by spice induced flavour differences rather than by price underpin the steady growth of imports. Given its size, new suppliers should find it easier to enter the international pepper market than other spice markets.

Prices

The variability of pepper prices over the past five years has been similar to the movement in prices of other spices (Table 3). However, this means that over the past ten years, pepper prices have varied by over 100 per cent with the greatest degree of instability occurring in the last five years (Chart 1). From the late 1970s to the early 1980s price movements in Year *t* were directly inverse to export movements in Year *t-1*. After the mid 1980s that

4 ITC, 'Spices. A survey of the world markets', Vol. 1, *Selected Markets in Europe*, Vol. 2, *Selected Markets in North and Latin America, Asia and the Pacific, the Middle East and North Africa*, Geneva, International Trade Centre, 1982; ITC Imports of spices into selected markets, 1981-85', *International Trade Centre Report of the First Meeting of the International Spice Group, New Delhi, November 1986, London, Commonwealth Secretariat, 1986*; ITC Imports of spices into selected markets, 1983-87', *International Trade Centre Report of the Second Meeting of the International Spice Group, Singapore, March 1989*.

relationship appears to have broken down. This suggests that stockholding in the user countries has become more important. The trade considers that major speculative elements have also entered the market, partially in an effort to offset attempts by the International Pepper Community⁵ to coordinate exports in an effort to stabilize prices, and partially in an effort to capitalize on the extreme price variations which have occurred over the past few years.

White pepper prices are higher than those of black pepper, a fact to be expected due to both the weight loss of about 25 per cent when the outer husk of white pepper is removed and the

cost of labour involved in processing. Moreover, not only are white pepper prices more volatile than black pepper prices (Chart 1), but the difference between the two is far from consistent (Chart 2).

Table 3 Annual spot prices of spices, New York market, 1983-88 (US\$/kg)

Spice	Low	High	Average	% variation around average
Cardamom ^a	3.94	25.35	9.38	228
Cassia ^b	0.94	1.19	1.09	23
Chillies ^c	2.94	6.80	4.10	94
Cinnamon ^d	1.87	3.31	2.49	58
Cloves ^e	3.31	9.81	5.88	110
Ginger ^f	1.43	3.42	2.25	101
Mace ^g	4.81	14.99	10.05	159
Nutmeg ^h	1.76	7.41	3.56	117
Pepper				
- black ⁱ	1.41	5.63	3.60	107
- white ^j	1.78	6.61	4.49	107
Turmeric ^k	1.15	2.54	1.81	76
Vanilla ^l	67.2	81.6	75.6	19

^aGuatemalan mixed greens. Based on 72 observations.

^bChinese. Based on 6 observations.

^cTabasco types. English pounds per metric tonne converted to US\$/kg by constant factor. Based on 41 observations.

^dCeylon No.2. Based on 6 observations.

^eBrazilian. Based on 6 observations.

^fCochin. Based on 6 observations.

^gNo.2 Siauw siftings. Based on 72 observations.

^hWest Indian whole. Based on 72 observations.

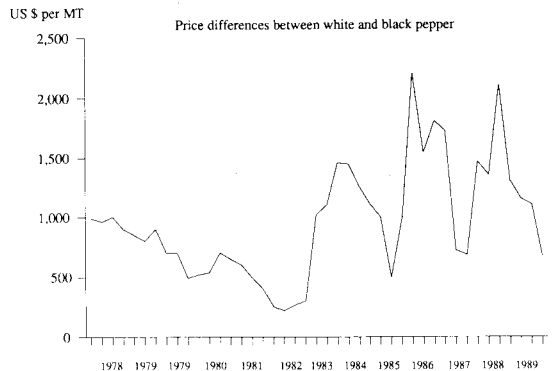
ⁱMalabar. Based on 72 observations.

^jMuntok. Based on 72 observations.

^kIndian Alleppey. Based on 6 observations.

^lMadagascar. Based on 6 observations.

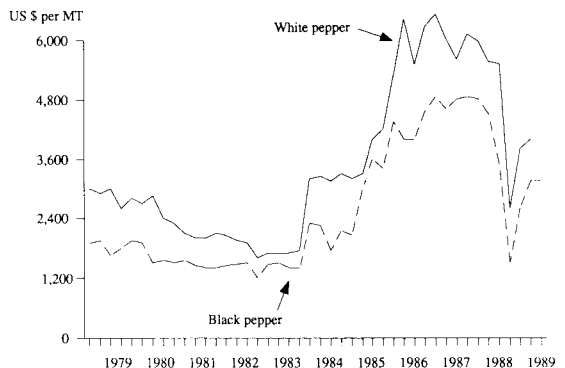
Chart 1



Prospects for pepper in the Pacific

Market prospects for pepper. Parham⁶ gave no marketing imperative as to why pepper should be introduced to the Pacific other than the fact that, for Fiji at least, production could be absorbed locally. He did state that the crop was viewed as being 'suitable for

Chart 2



5 Brazil, India, Indonesia and Malaysia.

6 Parham, *op. cit.*

smallholders'. A little later, the 1955 South Pacific Commission's Conference on the Regional Plant Introduction Program decided that 'Further introduction and selection work should be carried out on pepper...'⁷ but gave no reason as to why this should be done. Sills⁸ noted the wide price variations to which pepper was subject, indicating that the industry could move beyond Parham's view of producing merely for local consumption. Sills⁹ recommended that Fiji should produce black rather than white pepper because of the trend in the United States' meat industry and the fact that the small differences between black and white pepper prices did not warrant the extra effort to produce white pepper. He also stated that the local product met United States standards. Finally, he noted that the London market priced Fijian sun-dried black pepper marginally below that of Sarawak pepper, a difference he attributed to the indifferent method of preparation, and not quality.

Three markets are identified for South Pacific pepper:

Local markets Most of the Pacific countries import pepper. Further they have a growing tourist industry. This suggests some prospects for a local industry as an import replacement item.

Agricultural officials in Vanuatu are currently buying whole sun-dried black pepper for sale to local restaurants. This market will be quickly filled. Tonga has devoted considerable attention to the means by which pepper could be marketed locally. Ground and whole black and white pepper, and whole green pepper are currently marketed to the restaurant trade. Local supermarkets have been approached with some success. Ground green pepper has been successfully developed.¹⁰

Nevertheless, because pepper is not consumed traditionally in the South Pacific and, excepting Papua New Guinea and Fiji, there are no local food manufacturing industries, local markets are bound to be limited. A few tonnes annually would meet demand.

Region markets The dominant regional spice markets are New Zealand and Australia.

Australian spice imports Australia is an active importer of a wide range of spices.

Annual increases in imports over the decade have exceeded increases in population growth (Table 4). It is anticipated that this rate of growth will continue for at least the short term. Over the last decade, there has been rapid expansion of the fast food industry and a rapid rise in the popularity of 'ethnic foods' which have a high spice component. The expansion of the fast food industry is expected to continue. For its relatively small industry, Australia has a large number of indent agents, grinders, wholesalers, packers and importers, the vast majority of which are located in either Sydney or Melbourne. Importers may grind and pack the spices themselves or sell to packers or processed food manufacturers. Some processors deal direct with overseas suppliers.

Table 4 Australia: imports of pepper, 1978-87 (tonnes)

Spice	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Pepper	1097	1042	960	1009	1002	1016	987	1183	961	1153
group ^a	181	280	233	319	267	343	530	534	703	511
Total spice imports	3108	3257	2810	3238	2697	3357	3522	3965	3876	4124

^a'Pepper, pimento, ground, excl. paprika'.

Source: Australian Bureau of Statistics.

Australian pepper imports Over the past decade pepper in whole and ground form has been the most important spice imported into Australia. Given its share of imports, it is likely that pepper will benefit from the expected general growth of total Australian spice imports.

In the same period there has been a change in the origin of pepper imports. In the early 1970s Malaysia supplied about 80 per cent of imports with Indonesia and Singapore being the other suppliers. However over the past decade Malaysia's share has dropped to about 50 per cent with the balance being largely shared by Singapore and Indonesia.

Australia imports whole black and white berries, ground black and white products, and some special berries such as 'pinheads' and 'lightweights'. The percentage of ground pepper has declined. Although the white to black

7 SPC, 'South Pacific Commission meeting at Canberra on the long term regional plant introduction programme', *Agricultural Journal (Fiji)*, 27(1) and (2), 1956, pp.59-62.

8 V.E. Sills, 'Pepper', *Agricultural Journal (Fiji)*, 30(2), 1960.

9 *ibid.*

10 M. Perinent, 'Tonga', *Report of the Second Meeting of the International Spice Group*, Singapore, 6-11 March 1989.

pepper import ratio is approximately 2:1, importers are gradually shifting to black pepper and industrial users prefer black to white. The decline in ground pepper can be attributed to the preference of the manufacturing sector for locally ground product for quality assurance reasons.

Australia is endeavouring to develop a local pepper industry. Pepper has long been grown in the tropical areas of north Queensland as a decorative back-yard plant. Some of these varieties are now being examined for commercial exploitation. Local producers consider that concerns about quality standards in the imported product will enhance their market prospects with Australian manufacturers. They point to their experience with the mechanical drying of a host of crops as evidence of their ability to address the problems associated with sun-drying in a tropical environment. Nevertheless the industry has a long way to go before it could supply domestic demand. In the mean time, it is likely to concentrate on niche marketing into the high priced peppercorn-in-brine sector.

Pepper production has a number of appeals - a relatively long harvest period over which to generate cash flow, suitability for intercropping under coconut, and non-perishability after proper drying, thus overcoming unreliability of inter-island shipping. These combine to accentuate the suitability of the crop to smallholders spread over very large areas. In addition it is labour intensive. However, the crop has a 3-year gap between planting and production which could affect grower acceptance.

In the South Pacific local consumption is currently absorbing local production. Australia offers an attractive regional market but the number of methods by which spices are imported means that the appropriate market channel for South Pacific pepper will necessitate detailed exploration. Whilst there are large markets internationally these tend to be dominated by the four members of the International Pepper Community. Their ability to protect their market share against non-members can take the subtle form of entering cooperative promotional arrangements with major importers. With prices varying consider-

ably, policy-makers must address the question of preference for the relatively high but variable priced white pepper against the comparatively low but more stable priced black pepper.

Finally, the advantage of suitability to the irregularity of local shipping must be placed in the context of international shipping. Gough *et al.*¹¹ have demonstrated the 'thermal shock' that spices suffer when shipped by closed-box types of containers from tropical environments to out-of-season Northern Hemisphere countries. The issues of containerization, and aspects of the transmission of undesirable flavours in break-bulk and open-hold shipping must be examined further.

Whilst it is common to trace the modern development of the Pacific pepper industry to gardens established at Naduruloulou Experimental Station in Fiji in 1951, it appears that pepper was introduced to the Vaini Experimental Farm in Tonga just after World War II. The Naduruloulou plantings were cuttings of five strains from Sarawak. Some of these cuttings were later sent to Western Samoa and Tonga.

The two countries with the most active pepper research programs are Tonga and Vanuatu.

Tongan pepper research

Pepper research recommenced in the mid 1970s at the Vaini Research Farm on Tongatapu. It concentrated on the identification of appropriate supports and the collection of yield data. A similar, but much smaller project, commenced at the same time on Vava'u. Research began on 'Eua in 1988.

Kapok, areca nut, mango and dadap were noted as possible supports for pepper in Fiji in the early 1950s. Both Parham¹² and Sills¹³ noted the need for living supports. Nevertheless the Tongan trials examined both living and dead supports. The former have been *Cyathea rugosula* (Ponga) and *Erythrina fusca*. Treated and untreated coconuts have been examined as dead supports. Dead and living *Leuceana leucocephala* (*Siale mohemohe*) were also examined. By 1980, it was clear that Ponga from 'Eua was the best support. To begin with, *Erythrina* is inhabited by the piercing moth *Arthreis fullonia*. Further, untreated

11 M.C. Gough, C.L. Green, and S.I. Phillips, 'Quality maintenance during container vessel shipment of spices' in *Report of the Second Meeting of the International Spice Group*, Singapore, 6-11 March 1989.

12 Parham, *op. cit.*

13 V.E. Sills, 'Pepper growing for the smallholder', *South Pacific Bulletin*, April 1962, pp.31-33, 64-65.

coconut poles have a short life before rotting; after 3 years 46 per cent of the poles at Vaini had collapsed. Over the same period, only 15 per cent of the treated poles had collapsed. However, it is doubtful if treated poles would last the estimated 15 years of the economic life of a pepper vine. Further, the vines did not stick to dead coconut poles. This necessitates the tying of the vines at every node thereby increasing labour input. Even then, the vines tended to fall in strong winds. With *Sialemohe*, the dead poles rotted very quickly. Living *Sialemohe* was investigated by using cuttings which would root and form a live support. However rooting was very poor, with less than five per cent of the roots growing. Further, *Sialemohe* provides too much shade for the vines and requires considerable pruning. In contrast, Ponga's fern-type trunk provides a good support for the pepper's climbing roots and the tree has a good life span. Unfortunately the Ponga is concentrated in 'Eua and even there it is relatively rare. Transport to the other islands would be expensive.

For this reason, in the early 1980s, research switched to other living supports including live coconuts. *Leucaena glauca* was experimented with but was susceptible to *Heteropsylla cubana* attack. *Sesbania grandiflora* and *Cliricida* trials commenced in 1987. However 27 of the 56 *Sesbania* required replanting within a year and the vines grow faster than the supports. The *Cliricida* trials were abandoned by November 1988. Recent trials using live coconuts have been successful. Trees about 25 years old have been used with 25 of the 28 vines planted in June 1987 still surviving. The vines have been planted with 2-3 kg of compost, with the addition 15 months later of 50g of N.P.K. (Nitrogen, Phosphate, Potassium) and an additional kilogram of compost. The

need to tie the vines to the trees seems to be unnecessary once the vines grow about 30cm up the trunk. Breadfruit, *Artocarpus altilis*, has also been found to be a good living support.

Vanuatu pepper research

Small plots of pepper have been grown on agricultural research stations in Vanuatu since 1965. Varieties came from Fiji, Papua New Guinea and Pohnpei. The Vanuatu Pepper Development project commenced in 1982 with the intention of establishing the crop as an intercropping smallholder industry on the heavily populated islands. A year later, pepper was identified as one of seven potential non-traditional export crops.¹⁴

Because of the great diversity of soils and climatic factors between the islands a greater number of sites and varieties are being investigated than in Tonga. Like Tonga, research has concentrated on appropriate shade. Douglas¹⁵ stated that *Erythrina indica* (*Narara*), *Pterocarps indicus*, *Glyricidia maculata*, and *Leucaena sp.* have been considered as permanent living shade. The first two types require frequent pruning and *Glyricidia* drops its leaves in the dry season. Black palm has been successfully employed as a 'dead' support provided it is fully matured.

Pepper research in other Pacific countries

Black pepper has been considered as a potential crop in Western Samoa. While the endeavour is to develop a spice industry under the country's extensive coconut plantings, very little research has been conducted to date.

In Solomon Islands, the development of pepper has been given some consideration. However research effort has concentrated on chillies, turmeric, and cardamom.¹⁶

14 Hassall and Associates, *National Survey of Non-traditional Exports Crops: Vanuatu*, London, Commonwealth Secretariat, 1983.

15 M. Douglas, 'Pepper development in Vanuatu', Department of Agriculture, Livestock and Horticulture, Vanuatu (mimeo.), undated.

16 A.K. Bennett and P.M. Pelomo, 'Spice development in Solomon Islands' in *Report of the Second Meeting of the International Spice Group*, Singapore, 6-11 March 1989.