THE GOVERNMENTS OF MALAYSIA AND THE STATE OF JOHOR

PEPPER

WORKING PAPER

JOHOR TENGAH AND TANJONG PENGGERANG REGIONAL MASTER PLAN

1971

HUNTING TECHNICAL SERVICES LTD.

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OVERSEAS DEVELOPMENT GROUP
UNIVERSITY OF EAST ANGLIA

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1. Introduction

Virtually the whole of the West Malaysian pepper growing industry is located in central Johor, on the western outskirts of the Johor Tengah region. The acreage planted there increased from just under 1100 acres in 1965 to around 2200 acres in 1968.

There has been interest expressed recently in Johor state circles about possible expansion schemes for pepper in the area. Ideas have been put forward by the State Agricultural Office and SEDC for new plantings of up to 3,000 acres.

The land use potential analysis carried out during the course of the masterplan study has revealed little land in the Johor Tengah region with no constraints at all to pepper cultivation. About 60 percent of the area is however marginal for pepper with the remaining 40 percent totally unsuitable. More detailed soil surveys will undoubtedly reveal further isolated pockets of suitable land but these will probably be confined to areas of less than 100 acres.

In this working paper, pepper has been evaluated on the basis of a 1 acre family holding. The crop has an advantage in that all items of cost are related directly to size of pepper garden. There are therefore no economies of scale in pepper production and pepper gardens of say as little as 1/6 acre (100 vines) have the same rate of profitability as larger units. Capital and labour availability, the possession of the necessary skills and the willingness to risk quite wide price fluctuations will be the major factors in determining the place of pepper on an agricultural holding. The possible integration of pepper in a mixed farm situation is discussed in a working paper on mixed farming.(1)

2. Market Prospects

World production of pepper amounts to about 80,000 tons per year. The principal producers are Indonesia, India, Malaysia, Ceylon and Brazil (in that order). Most of this enters world trade. Yields in Sarawak average 2 - 2.5 tons per acre while India's 250,000 acres of crop average only 2 cwt. There is obviously great scope for increased output in that country although much of the pepper there is grown in association with other crops. Brazil has increased output considerably in the past 20 years. World demand is increasing at about 2½ percent per year or 2-3,000 tons. This amounts to 1-1,500 acres at Malaysian yields and there is therefore no scope for a great increase in acreage here. A national figure of 400-500 acres might be reasonable with perhaps about 100-200 in Johor. Prices are subject to marked short-term fluctuations, but will probably average around $120 per pikul for white and $90 for black (unground, fob Singapore).

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(1) Ref. South East Johor Project - Working paper on mixed farming - 1971

3. Costs

a. Land clearance and terracing

Land for pepper will have to be clean cleared. If sloping then some bench terraces will have to be constructed.

Clean clearance is charged at $350/acre.

Some terracing is assumed - at 5 mandays/acre. This is incorporated in the labour requirement figures.

b. Hardwood posts are needed to support the pepper vines. These have to be of a quality to minimise the necessity for changes. 600 stakes will be needed and are estimated to cost $2 each - $1,200.

Tools and equipment consisting of changkols, ladders, baskets, drying mats and washing pots are estimated at $50 per year.

c. Cuttings for new plantings will be available from the prunings of existing gardens. A price of 30 cts per cutting to allow for transport and losses is estimated. Total per acre is $180.

d. Fertilisers: Costs from all sources, including the evaluation of nutrient removal are $30 per acre in the first year rising to $210/acre in the fourth year. This is maintained until yields start falling in the 12th year and is arbitrarily reduced to the 20th year. If this cost is varied downwards in actual practice, it is assumed that a commensurate loss of yield will occur.

e. Pesticides and fungicides: Pest and fungus control materials are estimated at $8/acre to start with rising to $30/acre in the fifth year and continuing at this rate thereafter.

f. Labour: Present indications are that labour is used very intensively the whole year round, with a marked peak in January-March when harvesting takes place.

Estimates from Sarawak[1] suggest that about 350 man days/year are needed to maintain and harvest an acre in full production.

In the immature stage, 210 mandays are required for each of the first two years for maintenance and 240 days in the third year.

In the absence of firmer figures, it is assumed that harvesting will take up 110 mandays at full production and that this will be related to yield. For routine maintenance, 240 mandays will be maintained until the fifteenth year, when it will then be assumed to decrease until the final year.

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[1] Ref. Dept. of Agriculture/FAMA - Malaysia - Cost of Production of Various Crops in Malaysia.

TABLE 1 LABOUR REQUIREMENTS FOR PEPPER

Year	Man days maintenance	Man days harvest	Total
1	210	-	210
2	210	-	210
3	240	64	304
4	240	72	312
5	240	80	320
6	240	88	328
7	240	96	336
8	240	104	344
9	240	110	350
10	240	110	350
11	240	110	350
12	240	110	350
13	240	110	350
14	240	96	336
15	240	80	320
16	200	64	269
17	170	56	226
18	140	48	188
19	110	40	180
20	80	32	112

The highest labour peak is likely to be in January to March with February the month of greatest labour demand. Assuming a labour force of 2 adult equivalents available from the family, a small amount of casual labour will be needed in February, 17-20 days in total. This takes into account the peak requirements at harvest. Otherwise one man would spend 80 percent of his time looking after the maintenance requirements.

Labour is required for harvesting, weeding, manuring, mounding up and pest and disease control in the mature period. It is thought that the time taken for manuring (which is mainly done with organic wastes) and weeding (which is done manually) could be cut down considerably with the use of herbicides and granular compound fertiliser.

If the family was in fact able to provide two adult equivalent workers, then there would be spare time available to undertake further activities. On many pepper gardens visited, many family members

including school children would return home in order to help with the peak of the harvest.

The valuing of labour in such an enterprise is difficult as family labour circumstances can vary widely. Each operation requires a degree of skill and the daily management of a pepper garden is considered to be a very skilled operation if yields are to be high. However, the skills needed for such work are not necessarily applicable to operations in other activities. Three levels of labour value are therefore assumed. The first assumes that labour costs $4.50 per man-day required and the second level assumes an opportunity cost of $50 per month to family labour. In order to examine the total cash income of a smallholder the third level just charges for possible casual labour without imputing any value to the family labour used.

4. Output

Current yields in Johor are low. In 1965 the average yield was given as 1,765 lbs made pepper per acre. Yields are currently shown as having fallen to 950 lbs per acre in 1968 but during this time the acreage planted doubled from 1,089 in 1965 to 2,159 in 1968. Virtually none of the new plantings would have come into production over this period and so we may assume that yield per pre 1965 acre rose slightly to about 1,880 lbs.(1)

Yields in Sarawak are nearly three times this level per acre at a State average yield of 2.5 tons.(1)

The use of Sarawak experience in any newly planned pepper planting should increase yields to a maximum level of just over 2 tons of black pepper and just over 1½ tons of white pepper.

For estimation purposes it is assumed that 30 percent of pepper produced will be white and 70 percent will be black. The average price used throughout is $100/pikul or 75 cts/lb.

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(1) Ref: Dr. H.G. Raj - Pepper Industry in Johore yearning for a facelift - Draft in preparation for publication.

Year	Yield lbs. White/acre 100%	Yield lbs. Black/acre 100%	Assumed average yield 30% White:70% Black	Income/acre @ $100/pikul $
3	2,000	2,800	2,560	1,920
4	2,250	3,150	2,880	2,160
5	2,500	3,500	3,200	2,400
6	2,750	3,850	3,520	2,640
7	3,000	4,200	3,840	2,890
8	3,250	4,550	4,160	3,130
9	3,500	4,900	4,480	3,370
10	3,500	4,900	4,480	3,370
11	3,500	4,900	4,480	3,370
12	3,500	4,900	4,480	3,370
13	3,500	4,900	4,480	3,370
14	3,000	4,200	3,840	2,890
15	2,500	3,500	3,200	2,400
16	2,000	2,800	2,560	1,920
17	1,780	2,450	2,240	1,680
18	1,800	2,100	1,920	1,440
19	1,250	1,750	1,600	1,280
20	1,000	1,400	1,280	960

5. Calculation of Profitability

The calculations are shown using the costs as outlined above.

With family labour valued at $4.50 per day the internal rate of return is 17 percent and the net present value is $2700 per acre at 10 percent interest rate.

With the total family labour input valued at $50 per month, i.e. representing the shadow wage of unskilled labour and with the premium and rent deducted as a transfer item, the social rate of return is in excess of 35 percent and the net present value nearly $9000 per acre at 10 percent interest rate.

TABLE 2 PEPPER COST FLOW DATA - 1 ACRE

Year	Land clearance & terraces	Posts and tools	Planting material fertiliser and pesticides	Surveys fees and rent	Sacks	Casual labour	Total less family labour
1	350	1200	218	50	-	-	1818
2	-	50	103	8	-	-	161
3	-	50	198	8	4	-	260
4	-	50	231	8	7	-	296
5	-	50	240	8	13	-	311
6	-	50	240	8	20	-	318
7	-	50	240	8	25	-	323
8	-	50	240	8	33	40	372
9	-	50	240	8	33	85	416
10	-	50	240	8	30	85	413
11	-	50	230	8	25	85	398
12	-	50	220	8	18	85	381
13	-	50	210	8	15	85	368
14	-	50	200	8	12	-	270
15	-	50	180	8	8	-	246
16	-	50	160	8	7	-	225
17	-	50	140	8	5	-	203
18	-	50	120	8	5	-	183
19	-	50	100	8	3	-	161
20	-	50	80	8	3	-	141
NPV @ 15%	350	1510	1467	100	86	122	

One acre of pepper requires a labour input of up to 350 man days. The value imputed to this labour affects profitability markedly.

With smallholders, the important factor is total income and the following table shows monthly income per year from pepper, before and after repayment of capital at 7½ percent over 15 years. This represents total returns to farm family labour using the foregoing assumptions.

TABLE 3 NET CASH FLOWS UNDER DIFFERENT LABOUR COST ASSUMPTIONS

	Labour at $4.50 per day N.C.F.	Labour at $50 per month N.C.F.
1	- 2,763	- 2,368
2	- 1,106	- 753
3	292	1,068
4	460	1,272
5	649	1,497
6	846	1,730
7	1,055	1,975
8	1,232	2,157
9	1,427	2,352
10	1,430	2,355
11	1,455	2,380
12	1,472	2,397
13	1,485	2,410
14	1,108	2,028
15	714	1,562
16	507	1,103
17	460	885
18	411	665
19	364	449
20	315	227
N.P.V. at 10%	2,765	9,185
N.P.V. at 15%	350	5,866
	I.R.R. = 17%	I.R.R. = 38.1%

Year	Gross income/month M$	Income/month after repayment M$
1	-	-
2	-	-
3	138	118
4	155	135
5	174	154
6	194	174
7	214	194
8	230	210
9	246	226
10	246	226
11	248	228
12	249	229
13	250	230
14	218	198
15	180	160
16	141	121
17	123	103
18	105	105
19	87	87
20	68	68

With a crop that fluctuates in price as widely as pepper and has little flexibility in that it can occupy the ground for 20 years, it is probably unwise to rely on it as the sole source of income to a family. It has been noted in Sarawak[1] that many farmers plant more pepper than they can be expected to harvest, taking into account the other crop they are growing (often rubber) and their labour availability. From the farmers' point of view this could be a reasonable strategy to counteract price uncertainty, allowing them to forego the least profitable crop in any one year.

Another point which is worthy of examination is to see whether there is a pro rata yield reduction with wider spacing. If there is not then the pepper could possibly be profitably inter-cropped at wider spacings, reducing maintenance requirements by a large amount.

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(1) Ref. P.L. Leonard - Farm Planning and Land Development Schemes - Malaysian Economic Review Vol. 14, No.1 - April 1969.

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