THE ROLE AND FINANCIAL ANALYSIS OF MINI COFFEE-PROCESSING UNITS

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1. Introduction

1.1. Background and Justification

Since the third five year plan (Pelita III), was initially launched in 1974, the government has been placing emphasis on the accelaration of estate production development so as to enable the country (i) to increase farmers' income, (ii) to promote exports, (iii) to substitute imports, (iv) to enlarge employment and spread development over the country, (v) to encourage industrial sector and to establish national stability, and (vi) to optimize allocation and conservation of natural resources, in particular, land and water. In order to attain the objectives, the government has been attempting to do pertinent efforts in the forms of extensification, intensification, rehabilitation, and replantation (PRPTE). Basically, the efforts are performed in two different frameworks, i.e. Operational Unit Projects (UPP) and Nucleus Estate Projects (PIR). The nature of the two frameworks are integrated, multi-functional and concentrated.

The Operational Unit Project (UPP) is a task-force which has been specifically designed to serve farmers in their attempts to develop their farms with improved technology and then to organize them in the establishment of Village Unit Cooperative (KUD) in such a way that they can improve their farms and marketing. In Nucleus Estate Project (PIR), the nucleus which is either public or private estate enterprise helps its surrounding plasma farms in the use of modern technology and in the marketing of their products.

1.2. Objectives

The main objective of this study is to assess the feasibility of the new processing units in terms of project analysis criteria. The objective can be partitioned into two specific objectives, i.e.

1. To assess farmers' accessibilities either to processing units or to marketing services as a whole.
2. To collect information on cost components and benefits of operating the new processing units.

1.3. Problems

It has been envisaged that post harvest problem, e.g. post harvest technology and farm gate prices appears to be the pertinent and critical problems rather than production problems in itself. Agronomic practices such as fertilizing and pest control will, certainly, affect coffee bean quality.

Very often, due to immediate needs for cash, farmers harvest their coffee beans when the beans are still green in color. In most cases, farmers harvest their coffee beans without selecting and separating red-colored beans from the green ones. Moreover, drying is done by spreading the beans on the ground for several days depending on the intensity of solar energy. Such a means of drying results in lower quality of coffee seeds because the seeds are most probably mixed with soil, sand and other undesirable matters.

Having dried the coffee beans, farmers process the beans into seeds which are then ready for sale. Formerly, the processing may be done by means of (i) hand pounders, (ii) manually operated indigenous processors which are made of wood, and (iii) hullers which are usually used for rice. The three types of technology are not adequate in the sense that they still result in relatively high percentage of broken coffee seeds.

Worse image about Indonesian coffee in world market may be, in part, brought about by the post harvest technologies above. Every effort concerning appropriate post harvest technology is, therefore, highly being challenged and it should be supported by concerned institutions. In this connection, PRPTE project has supplied several mini processing units to Village Cooperative Units (KUD) as pilot projects. This study which is primarily concerned with the viability of the mini processing units operated by the cooperatives is, therefore, of great relevance as far as the Indonesian coffee quality is concerned especially in supporting the new standardization, i.e. defect system which has been proclaimed in 1983.

2. Methodology

2.1. Feasibility Criteria

This analysis is limited to financial or private benefit-cost ratio (B/C), net present value (NPV), internal rate of returns (IRR), breakeven point (BEP), and cash flow (see Gittinger, 1982 and Bunasor, 1981). The formula are presented below:

$$(1)\quad B/C = \frac{\sum_{t=0}^{n} Bt/(1+r)^t}{\sum_{t=0}^{n} Ct/(1+r)^t}$$

$$(2)\quad NPV = \sum_{t=0}^{n} \frac{Bt}{(1+r)^2} - \sum \frac{Ct}{(1+r)^t}.$$

$$(3)\quad IRR = r \text{ when } \sum_{t=0}^{n} \frac{Bt}{(1+r)^t} = \sum_{t=0}^{n} \frac{Ct}{(1+r)^t}.$$

where:

Bt = benefits obtained in year t, i.e. amount of coffee seeds that have been processed multiplied by the custom rate.

Ct = costs incured in year t, i.e. summation of fixed costs (depreciation and interest) and variable costs (diesel, labor, maintainance costs, etc.).

r = interest rate.

Breakeven point (BEP) is the amount of coffee seeds processed from coffee beans which is sufficient to cover the total costs (fixed and variable costs) for a unit of time. It is calculated from:

(4) $AFC + H(AVC - CR) = 0$

(5) $BEP = H \times PC$

where:

AFC = average fixed costs (depreciation and interest) per annum

AVC = average variable cost per hour (diesel, labor, etc.)

CR = custom rate (in Rp per hour)

PC = processing capasity (in kg of coffee seeds per hour)

H = breakeven point in hours

BEP = breakeven point in kg of coffee seeds

(6) Cash flow analysis is done in this study so as to assure the ability of cooperative to repay the credit of the processing unit acquisition.

3. Post Harvest Constraints to Better Product Quality

The quality of coffee seeds is determined by both pre harvest and post harvest practices. Bean damage associated with unproperly done pest control is one of pre

harvest practices causing low quality of coffee seeds. On the other hand, the coffee seed quality is also strongly influenced by how and when farmers pluck dry and process the coffee beans.

Reasons for not separating red from green beans. The 25 sample farmers can be classified into the reasons for not separating the two kinds of beans i.e.: 8% of them experienced lack of labor, 16% avoided thieves, 16% faced transportation problem and the remaining 60% of them associated their reason to the facts that they required immediate cash and there was no price discrepancy on the basis of quality. Such a method of harvest results in emptier, irrigular seeds after the beans have been dried.

Accessibility to processing units. Seventy-two percent of the sample farmers brought their coffee beans to huller for processing, while 12% and 26% of them processed their coffee beans using hand pounders and new mini processing unit, respectively. About 12 percent of them felt that their places were to far away from huller and mini processing units. New mini processing units may provide better quality of coffee seeds because it reduces the percentage of broken seeds. The private huller owners charged 6% of the coffee beans processed or twice as much as the cooperative's charge to farmers when they used the service of mini processing unit. However, farmers' accessibility to the service was still low because there were only two mini processing units in kecamatan of Pagelaran.

Marketing and prices. Having processed coffee beans into coffee seeds, most of the farmers (76%) sold the coffee seeds to kecamatan middlemen because they would received price which was higher than prices paid by door-to-door middlemen and cooperative KUD. The cooperative itself was so young that it had not got sufficient money to buy coffee from farmers. During the survey in 1983, the price of coffee seed was Rp 1.200 per kg which was much higher than the price in the previous year. Price fluctuation appears to be a pertinent and crucial problem in relation to the quality at farm level.[2)]

4. Soundness of the New Processing Unit Ownerships

In the computation of formula (1), (2), (3), (4) and (5), some information on the costs and benefits from the operation of several new processing units have been collected from the field. On the basis of this information, some assumptions have been set up, i.e.:

a. Investment cost or purchasing price of the new processing units is Rp 2,250,000 per unit.
b. Life time of the processing units is 5 years with zero salvage value.

c. Interest rate on investment is set up to be 10.5% per annum which is similar to the rate provided to farmers.
d. Processing capacity in 150 kgs per hour.
e. Interest rate is assumed to be 10.5 percent per annum.
f. In the computation of cash flow, the number of operating hours is 300 hours per annum, i.e. 5 hours per day for 60 days. This assumption is still pessimistic in nature because it may be raised. In year I it is assumed that it works only for 75% of 300 hours. These assumption is certainly, not applicable in the computation of breakeven point.
g. The assumption about variable costs is presented in Table 1.
h. For the purpose of conversion, yield is assumed to be 500 kgs of dried coffee seeds per hectare and the price is Rp 1000 per kg.

It is obvious from Table 1 to 3 and Figure 1 that the operation of the new processing units is viable from the view points of criteria presented in Table 1 to 5 moreover, farmers using the service will obtain higher rate of returns to their resources resulting from lower processing costs and most probably from higher price due to better quality of coffee seeds.

Table 1. Breakeven Point Computation of Mini Coffee-Processing Unit Operation.

1. Fixed costs per annum			
a. Depreciation 1/5 × Rp 2,250,000			= Rp 450,000.
b. Interest payment (16.5%) 1/5 × 0.105 $\sum_{n=0}^{4}$ (Rp 2,250,000 - Rp 450,000 N)			= Rp 141,750.
		Total	= Rp 591,750.
2. Custom received per hour			
2% × 150 kgs × Rp 1,000	= Rp 3,000		
3. Variable costs per hour			
a. Diesel 1 lt × Rp 150	= Rp 150		
b. Oil 2.2 lt × Rp 1,000/ 100 hours	= Rp 22		
c. Maintainance costs 0.2% × Rp 2,250,000 per 100 hours	= Rp 45		
d. Wages for 2 laborers 2 × Rp 1,500/8 hours	= Rp 375		
Total	= Rp 592		
4. Breakeven point:			
591,750/(3,000 - 592) = 246 hours per year or 36,900 kgs of coffee seeds or 73,8 ha of coffee per year.			

Table 2. B/C Ratio, Net Present Value and Internal Rate of Returns of the New Processing Unit Operation by Farmer's Cooperatives (in Rp 1000).

Years	Investment and Operation Costs		Gross Benefits		Net Benefits		Present Value	
	Actual	Present worth	Actual	Present worth	Actual	Present worth	i=15%	i=20%
0	2,250	2,250	—	—	(2,250)	(2,250)	(2,250)	(2,250)
1	133	121	675	611	542	490	471	452
2	178	145	900	737	722	591	546	502
3	178	132	900	667	722	535	475	418
4	178	119	900	604	722	485	413	348
5	178	108	900	546	722	439	359	290
Total	—	2,875	—	3,165	—	290	14	240

Notes:
B/C Ratio = 1.10.
NVP = Rp 290.
IRR = 15 + 5 (14)/254 = 15.28%.

Table 3. Cash Flow of Mini Coffee-Processing Unit with Bank Credit (in Rp 1000).

Items	Year I	Year II	Year III	Year IV	Year V
1. Inflows					
a. Credit	2,250				
b. Custom	675	900	900	900	900
Total	2,925	900	900	900	900
2. Outflows					
a. Investment	2,250				
b. Variable costs	133	178	178	178	178
Total	2,383	178	178	178	178
3. Residual cash	542	722	722	722	722
4. Repayment					
a. Credit	250	450	450	450	650
b. Interest	236	210	163	116	68
Total	486	660	613	566	718
5. Cumulative cash					
a. Each year	56	62	110	157	4
b. Cumulative	56	118	228	385	389

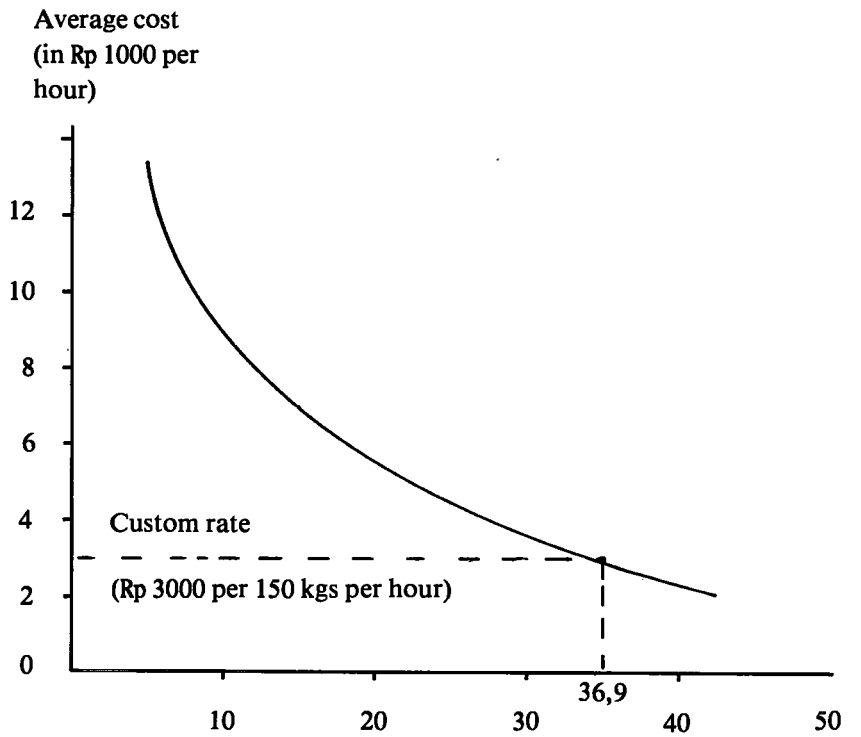
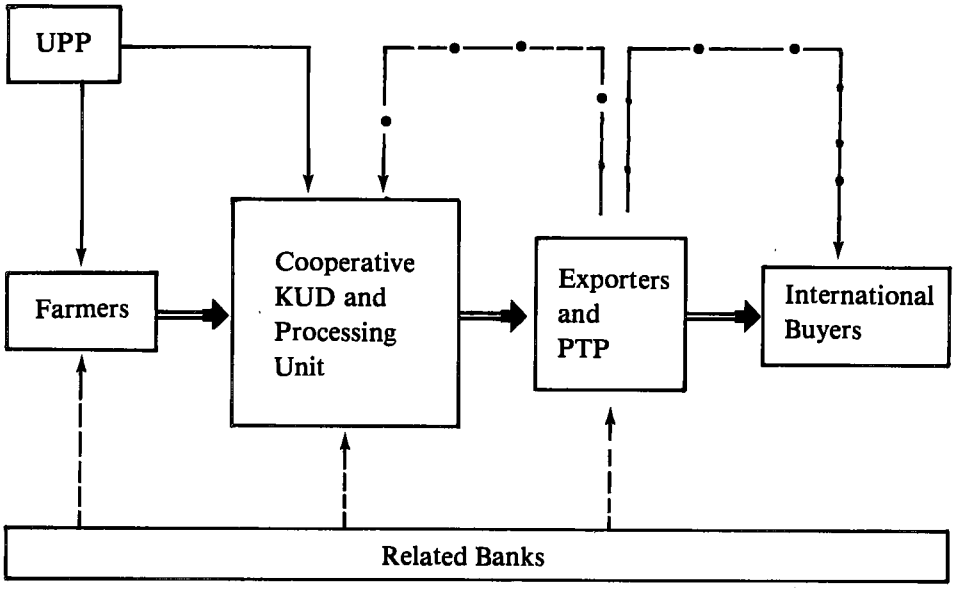


Figure 1. Average cost curve in the processing of coffee beans into coffee seeds.

Appropriate processing technology in itself is, however, not sufficient condition to assure better prices. The entire marketing system for coffee is, therefore, needs to be reorganized from farm level to exporters. Extension in farm level, guidance for the cooperative and controls over traders and exporters are all extremely required.

Figure 2 is proposed on the basis of field observation in the kecamatan of Pagelaran, Lampung. One of the main points here is that the elimination of marketing intermediaries between cooperative and exporter is of great influences in improving quality on one hand and in obtaining higher price on the other hand.



Notes:

Guidance
Coffee flows
Controls
Credit flows

Figure 2. Proposed organization of coffee marketing.

Integrated works among the Ministries of Agriculture, Cooperative, Trade and Finance seem to be potentially powerful in this regard. Otherwise, price fluctuation and uncertainty always become problems facing the farmers.

Conclusion and Recommendation

1. The use of mini coffee-processing units was sound both from the cooperative (KUD) operating the units and from farmers' sides. Since there were many farmers who had no access to better processing units, such a technology should be introduced and used in a larger number.
2. Higher accessibility of farmers to processing units is not a sufficient condition to better quality and, in turn, to better price of coffee. Reorganization of marketing system is of great importance where integrated task between the Ministries of Agriculture, Cooperative, Trade and Finance is extremely required. Direct channels both from farmers to cooperative and from co-

operative to exporters/PTP, even heart as conventional suggestion, should developed. Simplifying the marketing system in this regard will enable the government to have stronger control over both quality and prices from farm level to world market.

Notes

1) See the terms of reference for more detailed explanation about the Estate Development Projects for Farmers in Pelita III.
2) A useful contribution regarding the marketing of coffee in Indonesia is also presented by Nataatmadja H. and S. Baharsjah (1982).

References

Gittinger, J.P. 1982. Economic Analysis of Agricultural Projects. VI Press - Johns Hopkins, Jakarta.

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