**FINANCIAL ANALYSIS OF PUJON SOCIAL FORESTRY PROJECT
IN EAST JAVA, INDONESIA**
(Analisis Finansial Proyek Perhutanan Sosial Pujon, Jawa Timur, Indonesia)

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Ringkasan

Penelitian ini menganalisis aspek finansial proyek Perhutanan Sosial (PS) di Pujon, Jawa Timur. Analisis finansial ini dilakukan untuk mengetahui kelayakan finansial proyek PS, yaitu biaya dan penerimaan proyek berdasarkan harga pasar.

Hasil analisis finansial menunjukkan bahwa dengan tingkat discount rate 16 persen, proyek PS memberikan nilai net present value (NPV) pada Perum Perhutani sekitar Rp 2.9 juta per hektare (harga tahun 1993). Surplus finansial ini terutama diperoleh dari hasil penjualan tanaman pokok (*Agathis lorantifolia*). Sedangkan tingkat penerimaan finansial untuk Perum Perhutani diperkirakan sebesar 27.8 per sen. Karena itu dari pihak Perum Perhutani, proyek PS secara finansial adalah layak untuk dilaksanakan.

Pihak petani peserta memperoleh nilai NPV sebesar Rp 7.2 juta per hektar, jauh di atas nilai NPV yang diterima oleh pihak Perum Perhutani. Tetapi dengan tingkat perolehan lahan rata-rata seluas 0.19 ha per keluarga, dan dengan asumsi setiap keluarga terdiri dari 5 orang, petani hanya memperoleh sekitar Rp 280,000 per keluarga atau Rp 56,000 per kapita. Di samping itu, pendapatan petani per tahun dari proyek PS juga tidak stabil. Periode tahun ke 4 sampai tahun ke 9 dan tahun ke 21 hingga akhir proyek (tahun ke 35) merupakan masa krisis proyek, dari segi pendapatan petani.

I. INTRODUCTION

Social Forestry programs have been undertaken and studied in most developing countries (World Bank, 1989; Evan, 1992). Foley and Bernard (1984) mention that government social forestry policies have been implemented in more than 50 developing countries.

Social forestry has been the strategy for reforestation of the most degraded land in Java. The primary objective of this program is to induce sustainable forest management through successful reforestation efforts, as well as to induce forest protection by involving local participation in exchange for right to agricultural production from forest land.

In principle Java's social forestry program include the development of an agroforestry system on dry and marginal lands in which nearby farmers are actively involved in its development and maintenance. The Java's social forestry project is funded and managed by Perum Perhutani or The State Forestry Corporation (henceforth SFC) which controls and manages Java's protection and production forest. This is because under Government Regulation No.15, 1972, which was renewed by Government Regulation No.36, 1986, SFC holds an exclusive right to manage and utilize all state forest in Java.

The Java's social forestry project reviewed here began in 1987 on 16.2 ha of marginal land in Kedungrejo Forest Resort. The project is carried out under tumpang Sari (multicropping) scheme in which the main trees are planted along with other crops including food crops, perennial crops, fuelwood species, and other fodder. The main plantation in this project is *Agathis lorantifolia* while avocado and/or coffee, *Calliandra* sp, and elephant grass are planted as the perennial, fuelwood and fodder grass species. The most common food crops grown are corn and shallot.

The objectives of this study is to analyze the implementation and impact of the Pujon Social Forestry Project in Kedungrejo Forest Resort in East Java. Specifically, the study analysis the financial evaluation of the social forestry program.

II. METHODOLOGY OF RESEARCH

A. Data Collection.

Fields research was undertaken in December, 1993. Primary data were obtained through an informal questionnaire survey of social forestry participants. Thirty one respondents were selected of 93 participating farmers, of which ten respondent join the project in

1987, and the others in 1992. Secondary data and other information were gathered from existing records in district, provincial and national offices, including project records dating from 1987. The responses obtained from fieldwork were coded and stored on computer disk using Lotus 123 spreadsheets.

Because this study evaluates an on-going project, i.e., in the 6th and 2nd year of the two plots of the project, the input and output data involve both actual and observation data. For food crops farming, the data were obtained from project records and farmers interviews. For coffee and avocado, data for the 6th and 2nd year of the project (i.e., in 1993) were obtained from farmer interviews. These data, together with other technical information available from De Graaf and Dwiarsito (1980), were then employed as a basis for estimating input and output data for coffee and avocado in other years.

For the main plantation (*Agathis lorantifolia*), fuelwood tree (*Caliandra*), and fodder grass (*Elephant grass*), technical and physical specifications, for example, number of cuttings for fodder, were obtained from field observation and farmer interview. On the basis of this information, plus technical information available from Sudarmo (1956) and Reforestation Team (1971), input and output data for *Agathis lorantifolia* were estimated.

B. Financial Analysis

As the project involves two different agents, i.e., SFC and farmers under a partnership contract, this study analysis the financial performance of the project from three different units of analysis, i.e., the project as whole, the project from the viewpoint of SFC, and the project from the viewpoint of participating farmers. This disaggregation will enable the author to analyze the project financial benefits accrued to each agent involved.

The reasons for doing a financial analysis in this study is mainly to examine the financial feasibility of the project on the basis of actual costs and revenues according to market prices. This will then facilitate an analysis about financial sharing of both project cost and revenues between SFC and farmers.

In this financial analysis there are three categories of receipt that are treated in specific ways described below :

a. **Land rent.** Farmers have to pay nothing to SFC for the plot they cultivate, even though in return they have to spend their labor time for the maintenance of the main plantation. This land rent is not ac-

counted as a financial cost for SFC because, by law, SFC is granted a fee simple ownership on every forested land in Java by the Government. Thus, SFC pays nothing for the acquirement of the reforestation plot.

b. **Family labor.** Time spend by participating farmers and their family in the project is not monetized in financial analysis. This is because both SFC and farmers did not in fact spend any rupiahs for family labor.

c. **Subsidies.** SFC subsidizes farmers with planting materials i.e., coffee, avocado, calliandra and grass fodder, and fertilizers needs for foodcrops farming in the first year and half of the needs in the second year. These receipts are included in the analysis as costs borne by the SFC and the project as a whole, but is excluded from the costs borne by farmers. In other words, these subsidies make up a certain portion of farmer's net financial benefit, i.e., revenues minus costs.

C. Discount Rate

There are two school of thought regarding the selection of a social discount rate, one based on the social opportunity cost of capital (SOCC), and one the social time preference rate (STRP). The primary argument for the SOCC is that society would not benefit if resources that would have produces a higher rate of return in an alternative use, either in the public or private sector, were drawn into uses where they yield a lower rate of return (Baumol, 1988). Given that the rates of return in the private sector are usually higher than those in the public sector, no public investment should therefore be undertaken unless the investment produces a rate of return higher than the return obtained in the private sector. Thus, a social discount rate should be chosen such that it indicates positive for a public project if and only if its gross benefits exceeds its opportunity costs in the private sector.

The STRP is based on the view that individuals face a trade-off between present and future consumption. Thus, a discount rate should represent a rate at which individuals are prepared to substitute future for present consumption.

In this study SOCC approach is followed. The pre-tax rate of return on capital of twenty seven Indonesian companies listed in the Jakarta Stock Exchange in 1993 exhibit a median of 23.8 per cent. It is then proposed that the "best guess" for a nominal social discount rate is in the order of 24 per cent. Given an average annual inflation rate of 7.7 per cent during 1985-1991, a real discount rate of 16 per cent is proposed.

III. RESULTS AND DISCUSSIONS

A. Costs and Commodity Components

1. Costs of Establishment

These cost items refer to all costs associated with the establishment of the Pujon Social Forestry Project. The term costs of establishment is used because, unlike the usual "investment cost" which occurs only in the initial years of a project, these costs span the entire life of the main plantation, i.e., 35 years. That is, they are fixed or overhead costs.

In financial terms, all costs of establishment are incurred by SFC. Farmers contribute their unpaid family labor for the establishment of the project, while no hired laborer are employed. Details of these costs are presented in Table 1.

2. Food Crops

Four common food crop farming systems were observed in the project plots, that is :

1. Two shallot crops in Years 1 and 2, and one shallot crop in Year 3 (35 per cent),
2. Two shallot crops and one corn in Years 1 and 2, and one shallot crop in Year 3 (23 per cent),
3. Two corn crops and one shallot crops in Years 1 and 2, and one corn crop in Year 3 (12,9 per cent), and
4. Three corn crops in Years 1 and 2, and one corn crop in Year 3 (12,9 per cent),

The annual costs and revenues of food crop farming are presented in Table 2. It should be noted that the financial surplus to the farmers in year 1 is higher than that in year 2, and more than that in year 3. This is

Table 1. Estimated Financial Costs of Establishment (Rp/Hectare), 1993 Prices

Tabel 1. Perkiraan Biaya Pembangunan, Harga tahun 1993

Financial (Finansial)	Year (Tahun)					Total	%
	1	2	3	4-35			
SFC (Perum Perhutani)							
Planting materials (Bibit tanaman)							
New Planting (Tanaman bibit baru)	256,950	0	10,000	0		266,950	19
Replanting (Penanaman ulang)	0	7,240	0	0		7,240	1
Fertilizers (Pupuk)	260,750	133,750	0	0		394,500	28
Labor (Tenaga kerja)	0	0	0	0		0	0
Administration and management (Administrasi dan manajemen)	35,000	10,000	10,000	10,000		375,000	27
Other materials (Bahan lain)	175,000	5,000	5,000	5,000		345,000	25
Total costs (Total biaya)	727,700	155,990	25,000	15,000		1,388,690	100
Present Value of costs (Nilai sekarang dari biaya)	818,812						

Table 1. Indicates the following :

- a. The present value of these costs in financial terms amount to Rp 818,812, in 1993 prices.
- b. Purchase of planting materials is shown not to be the largest portion of these establishment costs. The costs of planting materials makes up only about 19 per cent of the establishment costs in financial terms. The costs associated with fertilizers, administration and management, and provision of other materials account for the largest portion of the establishment costs.

because SFC halves its fertilisers subsidies in the second year, and because the shading problem means only one food crop can be cultivated in the third year.

The most beneficial cropping pattern appears to be the second pattern, i.e., two shallot crops in years 1 and 2, and one shallot crop in year 3, which recorded a total surplus of Rp 2,337,372 per ha over the three year. Cropping pattern # 4, i.e., three corn crops in years 1 and 2, and one corn crop in year 3 is shown to be the least beneficial one. It produced an economic surplus of about Rp 655,362 per ha over the three years. Given its relatively low surplus, it appears that

this pattern is chosen because of technical constraints faced by some farmers, for example, lack of expertise to grow shallot.

Table 3 present the annual costs and revenue for *Agathis larantifolia*. It is shown that in years 10 to 35 the total annual financial surplus generated from the

Table 2. Annual Costs and Revenue for Food Crop (Rp/Hectare) 1993 Prices
Tabel 2. Biaya dan Pendapatan Tahunan tanaman Panjau, Harga Tahun 1993

Year (Tahun)	Financial (Nilai)		
	1	2	3
Crop Pattern #1 (Pola Tanam #1)			
Output value (Nilai hasil)	5,292,088	5,292,088	2,646,044
Seed, fertilizers, and other non labor costs (Bibit, pupuk, & lain-lain, selain biaya tenaga kerja)	3,080,200	3,188,090	1,594,045
Family labor (Tenaga kerja keluarga)	1,732,088	1,623,998	811,999
Hired labor (Tenaga kerja yang diupahkan)	480,000	480,000	240,000
Surplus (Hasil bersih)	1,732,088	1,623,998	811,999
Crop Pattern #2 (Pola Tanam #2)			
Output value (Nilai hasil)	5,815,279	5,815,279	2,646,044
Seed, fertilizers, and other non labor costs (Bibit, pupuk, & lain-lain, selain biaya tenaga kerja)	3,103,400	3,270,110	1,594,044
Family labor (Tenaga kerja keluarga)	0	0	0
Hired labor (Tenaga kerja yang diupahkan)	556,000	556,000	240,000
Surplus (Hasil bersih)	2,155,879	1,989,169	811,999
Crop Pattern #3 (Pola Tanam #3)			
Output value (Nilai hasil)	3,692,427	3,692,427	5,231,924
Seed, fertilizers, and other non labor costs (Bibit, pupuk, & lain-lain, selain biaya tenaga kerja)	1,856,800	1,758,085	82,020
Family labor (Tenaga kerja keluarga)	0	0	0
Hired labor (Tenaga kerja yang diupahkan)	392,000	392,000	76,000
Surplus (Hasil bersih)	1,713,627	1,542,342	365,172
Crop Pattern #4 (Pola Tanam #4)			
Output value (Nilai hasil)	1,569,575	1,569,575	523,192
Seed, fertilizers, and other non labor costs (Bibit, pupuk, & lain-lain, selain biaya tenaga kerja)	70,200	246,060	82,020
Family labor (Tenaga kerja keluarga)	0	0	0
Hired labor (Tenaga kerja yang diupahkan)	228,000	228,000	76,000
Surplus (Hasil bersih)	12,713,575	10,955,515	365,172

3. The Main Plantation (*Agathis larantifolia*)

Resin production is neglected in this study, because *Agathis lorantifolia* produce resin of a low quality at a very low volume (Reforestation Team, 1971). Hence, only roundwood and fuelwood entered into the calculation. According to the contract, SFC is the only party allowed to harvest the roundwood. However, matters are less clear for fuelwood, but given the relatively low quality of fuelwood obtained from *Agathis larantifolia*, it is assumed that SFC allows farmers to collect the entire fuelwood production. The main plantation is not directly fertilized. The plantations benefits from the fertilizing of food crops, coffee, and fodder grass. In addition, farmers are to spend some amount of labor time for the maintenance of the main plantation.

main plantation varies from Rp 1.3 to 18.8 million per hectare. It should be noted that SFC gains more than 95 per cent of surpluses produced by the main plantation.

4. Calliandra

Calliandra is another source of fuelwood for participating farmers. As in the case of the main plantation, it is assumed that SFC allows farmers to collect the entire fuelwood production of calliandra. Like the main plantation, the calliandra receives no direct fertilizing but it benefits from the fertilizing of other crops.

Table 4, presents the annual costs and revenue for calliandra. As is the case of the main plantation, the financial surpluses obtained from calliandra are relatively low compared to those obtained from food

crops. It can even be as low as Rp 92,500 per year in financial terms in years 10 to 12. larger surplus, reaching as high as Rp 1.7 in years 16 to 20 in financial terms.

Table 3. Estimated Costs and Revenue for Agathis Lorantifolia
Tabel 3. Perkiraan Biaya dan Pendapatan dari Agathis Lorantifolia

Financial (Finansial)	Year (Tahun)							
	4	5	10-14	15-19	20-24	25-29	30-34	35
SFC (Perum Perhutani)								
Roundwood (Kayu Bulat), m ³ /ha	0	0	20.9	43.1	65.2	84.2	101.6	302.3
Output value (Nilai Hasil), Rp	0	0	1,376,931	2,837,313	4,297,694	5,549,450	6,696,893	19,923,777
Harvesting Costs (Biaya Permanen), Rp	0	0	129,544	266,940	404,335	522,103	630,057	1,874,466
Surplus (Hasil Bersih), Rp	0	0	1,247,387	2,570,373	3,893,359	5,027,347	6,066,836	18,049,309
Farmers (Petani Peserta)								
Fuelwood (Kayu Bakar), m ³ /year	0	5.9	5.2	10.8	16.3	21.1	25.4	75.6
Output value (Nilai Hasil), Rp	0	54,575	48,318	99,564	150,811	194,736	235,001	699,146
Male Family Labour (Tenaga kerja laki-laki Keluarga)								
Maintenance (Pemeliharaan), days	15	5	5	5	5	5	5	5
Harvesting (Panen), days	0	18	16	33	51	65	79	234
Family Labour (Tenaga kerja Keluarga), Rp	0	0	0	0	0	0	0	0
Surplus (Hasil Bersih), Rp	0	54,575	48,318	99,564	150,811	194,736	235,001	699,146
Project/Proyek								
Roundwood (Kayu Bulat), m ³ /year	0	0	20.9	43.1	65.2	84.2	101.6	302.3
Fuelwood (Kayu Bakar), m ³ /year	0	5.9	5.2	10.8	16.3	21.1	25.4	75.6
Output Value (Nilai Hasil), Rp	0	54,575	1,425,249	2,936,877	448,505	5,744,186	6,931,894	20,622,923
Harvesting Cost (Biaya Panen), Rp	0	0	129,544	266,940	404,335	522,103	630,057	1,874,466
Family Labour (Tenaga kerja Keluarga), Rp	0	0	0	0	0	0	0	0
Surplus (Hasil Bersih), Rp	0	54,575	1,295,705	2,669,937	4,044,169	5,222,083	6,301,837	18,748,458

Table 4. Estimated Financial Costs and Revenue for Calliandra, Per Hectare, 1993 Prices
Tabel 4. Perkiraan Biaya dan Pendapatan dari Calliandra, Harga Tahun 1993

Financial (Finansial)	Year (Tahun)					
	1-3	4	5	6	7-9	10-12
Farmers (Petani Peserta)						
Fuelwood (Kayu Bakar), m ³ /year	0	14	0	27	17	10
Output value/(Nilai Bersih), Rp	0	129,500	0	249,750	157,250	92,500
Male Family Labour (Tenaga kerja laki-laki Keluarga)						
Maintenance (Pemeliharaan), days	28					
Harvesting (Panen), days	0	43	0	84	53	31
Family Labour (Tenaga Kerja Keluarga), Rp	0	0	0	0	0	0
Surplus (Hasil Bersih), Rp	0	129,500	0	249,750	157,250	92,500

5. Coffee and Avocado

Table 5 and table 6 present the annual costs and revenue per hectare for coffee and avocado. However, this statement is indicative only, because is not directly fertilized. It benefits from the fertilizing of coffee from years 1 to 15, and from that of foodcrops and fodder grass from year 1 to 5.

Coffee begins to produce a surplus in year 4, and its surpluses vary from Rp 30,790 to Rp 178,600 in financial terms. In contrast, avocado produces a much

6. Fodder Grass

The type of fodder grass planted is elephant grass (*Pennisetum purpureum*). As the sub-district of Pujon is one of the milk production center in East Java, fodder plantation has a significant economic value for participating farmers. SFC allows the farmers to cultivate fodder during the first five years of the project, especially around the edge and along each strip between the trees. Table 6 shows the annual unit costs and revenue for fodder grass, during the five years of

fodder production the annual surpluses generated vary from a low of Rp 4,000 to a high of Rp 517,000 financial terms.

comes solely from sales of roundwood obtained from *Agathis lorantifolia* and is surplus over the total costs of establishment.

Table 5. Estimated Annual Costs and Revenues Per Hectare For Coffee and Avocado

Tabel 5. Perkiraan Biaya dan Pendapatan Tahunan per Hektar dari Kopi dan Alpukat

Financial (Finansial)	Year (Tahun)									
	1	2	3	4	5	6	7-9	10-12	13-15	16-20
Coffee/Kopi										
Financial (Finansial)										
Farmers (Petani Peserta)										
Output Value (Nilai Hasil), Rp	0	0	0	2,500	102,500	155,000	205,000	0	0	0
Fertilizers (Pupuk), Rp	5,500	10,380	15,880	1,710	26,400	26,400	26,400	0	0	0
Family Labour (Tenaga Kerja Keluarga), Rp	0	0	0	0	0	0	0	0	0	0
Surplus (Hasil Bersih), Rp	-5,500	-10,380	-15,880	30,790	6,100	122,600	178,600	0	0	0
Avocado/Alpokot										
Financial (Finansial)										
Farmers (Petani Peserta)										
Output Value (Nilai Hasil), Rp	0	0	0	0	0	232,800	582,400	1,164,800	205,000	0
Fertilizers (Pupuk), Rp	0	0	0	0	0	0	0	0	26,400	0
Family Labour (Tenaga Kerja Keluarga), Rp	0	0	0	0	0	0	0	0	77,000	0
Surplus (Hasil Bersih), Rp	0	0	0	0	0	232,800	582,400	1,164,800	101,600	0

Table 6. Annual Units Costs and Revenue for Fodder Grass (Rp/Hectare), 1993 prices

Tabel 6. Satuan Biaya dan Pendapatan Tahunan dari rumput ternak, Harga Tahun 1993

Financial (Finansial)	Year (Tahun)				
	1	2	3	4	5
Farmers (Petani Peserta)					
Output Value (Nilai Hasil), Rp	4,000	80,000	600,000	600,000	600,000
Fertilizers (Pupuk), Rp	0	0	83,000	83,000	83,000
Family Labour (Tenaga Kerja Keluarga), Rp	0	0	0	0	0
Surplus (Hasil Bersih), Rp	4,000	80,000	517,000	517,000	517,000

B. Financial Returns

Because it is almost impossible to apportion joint costs associated with joint use of fertilizers, labor time, and establishment costs, a partial financial analysis for each crop is not undertaken here, though an indicative comparison between surpluses gained by each crop is presented at the end of this section. The analysis focused mainly on the project's financial returns and its distribution between SFC and farmers. In computing these returns, financial surpluses gained from each crop pattern of the food crop are weighted on the basis of the distribution of each pattern.

1. Financial Return to SFC

At a discount rate of 16 per cent, it is estimated that during its life, i.e., 35 years, the project generated a net present value amounting to about Rp 2.9 million per hectare at 1993 prices (Table 7). This financial surplus

The financial rate of return for SFC is estimated to be about 27.8 per cent, well above the social opportunity costs of capital of 16 per cent. Hence, from the SFC point of view the project appears to be financially profitable. This is a promising indication given that SFC gains only roundwood from the project, while the other produce of the project, i.e., corn, shallot, fuelwood, coffee, avocado, and fodder grass, is allocated to the participating farmers. Also, SFC has to financially incur all expense associated with project establishment.

It must be remembered, however, that SFC has to spend nothing for farmers's labor used for project establishment and the maintenance of the main plantation. Had these labor inputs been paid for in cash, the net present value would drop by about 9 per cent to Rp 2,638,026 and the rate of return would decline to 25.4 per cent (Table 8). In other words farmers involvement in the project is shown to be financially beneficial for SFC because it increases the project's financial surplus and rate of return.

Table 8. Summary Results of Financial Analysis
Tabel 8. Ringkasan Hasil-Hasil Analisis Finansial

Financial (Finansial)	Year (Tahun)	
	NPV (Rp) ¹⁾	IRR
SFC(Perum Perhutani)	600,000	600,000
If farmers are paid wages for labour used for project establishment (Jika petani diupah untuk tenaga yang terpakai untuk pengembangan proyek)	83,000	83,000
Farmers (Petani Peserta)	517,000	517,000
Project (Proyek)		
Actual conditions (Kondisi sekarang)		
If land cost is taken into account (Bila Sewa Lahan dihir...		
Low cost of land (Sewa lahan rendah)		
Medium cost of land (Sewa lahan sedang)		
High cost of land (Sewa lahan tinggi)		

Notes : ¹⁾ Net Present Value at discount rate of 16 %

²⁾ Land rent is assumed to represent the cost of land. It should be noted, however, that this cost does not necessarily represent the "true" opportunity cost of land.

Figure 1. Flows of Financial Surpluses Gained by Farmers (Rp.), 1993 Prices
Gambar 1. Aliran Surplus finansial yang diperoleh Petani, Harga Tahun 1993

2. Financial Return to Farmers

Table 8 shows that farmers gain a financial net present value of Rp 7.2 million from the project. This value is well above the net present value per hectare gained by SFC. The financial rate of return of the project for farmers

cannot be computed here because, as farmers spend nothing for project investment nor for land rent, this has resulted in a high positive value of net surpluses in the earlier years of the project. In turn this presents the computation of the internal rate of return (IRR) because no discount rate will make the net present value equal zero.

Given that farmers involvement has contributed to increase the survival rate of the main plantation, project sustainability seems to be greatly dependent to farmers active involvement in the project. It is likely that farmers would be willing to spend more labor if the project generates adequate and continuing financial surpluses for them. This argument gives significance to an analysis of the annual flows of financial surpluses gained by participating farmers, as shown in Figure 1.

Several interesting features can be noted in Figure 1. First, despite the high net present value, in practice the actual financial surplus gained by the farmers is not very high. Given the average land distribution of 0.19 hectare per family, and assuming a family size of 5 persons per family, the farmers gain only about Rp 280,000 per family or Rp 56,000 per capita in the first year. This is far below the average per capita income of about US.\$ 570 or Rp 1,140,000 in 1992.

Second, the project does not guarantee a steady annual financial surplus for the farmers (Figure 1). The period from year 4 to 9 appears to be critical for the project's sustainability. This is because in these years farmers financial surpluses drop very dramatically compared to those received in the first three years. In years 4 to 9 farmers have to rely mainly on fodder grass and avocado as their income source to replace the income loss due to the termination of food crop farming. The other crops, i.e., *Agathis lorantifolia*, calliandra, and coffee produce a relatively low financial surplus. During the period from years 10 to 20 farmers financial surpluses increase significantly, reaching the peak in year 15 with a surplus of about Rp 76,000 per capita. However, from years 21 to the end of the project, farmers financial surpluses decline dramatically to a level below Rp 10,000 per capita.

These facts call for further improvement in the project design so as to increase the project's sustainability. Of particular importance in this case is to develop a planting scheme which is capable of ensuring a steady financial surplus for the farmers during years 4 to 9, and years 21 to 35.

3. Financial Return to Project

The total financial surplus of the project is shown to be Rp 10.1 million per ha in 1993 prices at a discount rate of 16 per cent. As with the case of the rate of return to farmers, the financial rate of return for the project can not be computed here because of the high positive return in the earlier years.

It should be noted that, because SFC acquires the project land by government decree, the above financial surpluses are computed without taking into account the costs of land.

4. The Rank of Financial Surpluses

The Relative importance of each crop as an income source can be indicatively shown, assuming that joint costs are distributed evenly to each crop. Table 10 shows that food crops, avocado and fodder grass appear to be the most important crops for farmers in financial terms. The main tree crop is shown to be the least important. For the project as a whole, however, the most important crop in financial term is the main plantation, followed by food crops and avocado.

Table 10. The Rank of Financial Surpluses

Tabel 10. Peringkat Finansial Surplus

Rank	Farmers	Project
1	Food crops	Main Plantation
2	Avocado	Food Crops
	Fodder grass	Avocado
	Coffee	Fodder grass
	Calliandra	Coffee
6	Main Plantation	Calliandra

IV. CONCLUSION

This study has evaluated the financial analysis of the Pujon Social Forestry Project in Kedungrejo Forest Resort, Malang District. The project is funded and managed by Perum Perhutani (The State Forestry Corporation of Java, SFC) which controls and manages Java's production and protection forests.

At areal discount rate of 16 per cent, it is estimated that the project generates a net present value for SFC of about Rp 2.9 million per hectare at 1993 prices. This financial surplus comes solely from sales of roundwood obtained from *Agathis lorantifolia*. This financial rate of return for SFC is estimated to be about 27.8 per cent. Hence, from SFC point of view the project appears to be financially feasible. Farmers gain a net present value of 7.2 million per ha from the project, well above the net present value per hectare gained by SFC. However, in practice the actual financial surplus gained by the farmers is not very high. Given the average land distribution of 0.19 ha per family, and assuming a family size of 5 persons per family, the farmers gain only about Rp 280,000 per family or Rp 56,000 per capita in the first year. Moreover, the project does not guarantee a steady annual financial surplus for the farmers. The period from years 4 to 9 and years 21 to end of the project appear to be critical for the project sustainability.

The total financial surplus of the project was estimated to be about Rp 10.1 million. Further calculation showed that the project would be financially feasible even if SFC had to pay for land rent.

The following specific suggestions arise from this study :

1. SFC needs to increase the scale of farmer's plots so as to increase the actual financial surpluses enjoyed by each farm family. An increase in land holding can in turn increase the per capita financial surpluses.
2. To increase the project sustainability, it is of particular importance to develop a planting scheme which is capable of ensuring a steady financial surplus for the farmers during the periods of years 4 to 9, and years 21 to 35. SFC may consider allowing farmers to recultivate food crops, fodder grass, and others crops during years 21 to 35 so as to provide a steady income flows for the farmers.

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