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The Improvement of Willingness to Pay for Land in Forest Revitalization Development in Kalimantan Timur Province

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HASID, ZAMRUDDIN. The Improvement of Willingness to Pay for Land in Forest Revitalization Development in Kalimantan Timur Province (Under Supervised by Abubakar M. Lahjie, Afif Ruchaemi and Muhammad Saleh Mire).

ABSTRACT

The factors of wood scarcity were the longtime ago exploitation and the high demand of wood for export and import which may not always be relied on the supply from natural forest. To solve, it needed the development of forest planting industry by planting fast and slow grows plant through the expectation value of land.

The purposes of this study were to know the increment volume of fast-growing and slow-growingwood, to know the profit of forest cultivation and to know willingness to pay to land.

The method of collecting the data was conducted using direct observation and interview to the administrator and the worker. The collected data was analyzed by using financial analysis with Payback Period (PP), Net Present Value (NPV), Net B/C ratio, Internal Rate of Return (IRR), Equivalent Annual Annuity (EAA) and Willingness Pay to Land (WPL) method based on technical and economic cycle.

The calculation showed that the kinds of fast-growing plant (*P.falcataria, A. Mangium* and *E.deglupta*) in the age of 10 have bigger increment than 15m^3/ha/year. In the other hand, the kinds of slow-growing plant (*S. macrophylla, S.leprosula* and *G.arborea*) had smaller increment than 15m^3/ha/year. In addition, the variations of each plant increment plant were different, which can affect the financial value.

Financially, under technical cycle, almost all the plants were good to be cultivated except *G.arborea*. While, under economic cycle, all the plants were good to be cultivated because their IRR value were higher than Minimum Accessibility Rate(MAR=4.5%).

The fast-growing plants had higher wished price land than the slow-growing plants, in which under the technical cycle, *G.arborea* had negative willingness pay for land. In the other hand, under the economic cycle, the result showed that *P. falcataria* had the highest willingnesses pay for land, while plant with the lowest wished price land was *G.arborea*.

The revitalization of forest will give tax potency that must be paid by the company based on the wished price land from every kinds of plant about 15% (per unit) as the plants tax that will be charged into the selling price of the wood.

The forest revitalization which was conducted by the company, the government and the public can be the source of company profit, government revenue, and public income for a long period. With economic cycle, the income will be higher than the one under technical cycle.

Keywords: Willingness to Pay for Land, Forest Revitalization Development

1. BACKGROUND

In 1970s occurred Kup flood. It brought so many consequences. The Forest department late director general of forestry cared to choose and do silviculture system for natural forest.

In 1974-1975 the management of natural forest used TPI (Selective logging system).This system gave license of forest concession for private for 20years. This license for the usefulness of forest resources in outside java island. over time,there is a change system from the selective logging system (*Tebang Pilih Indonesia)* to Indonesian selective planting (*Tebang Pilih Tanaman Indonesia)*. It is wellknown as Indonesian selective planting lines (*Tebang Jalur Tanam Indonesia)*.

Nowadays, forestry experts do effort to increase the increment of natural forest. The effort is *Bina pilih,* the new system is intensive silvicultural. Another system that can be applied in forest area is multisystem silvicultural. This system gains the forest crops. Forest Department launches *Pembangunan hutan tanaman* program to solve the high demand of wood for export and import which may not always be relied on the supply from natural forest.The society called this program as *Hutan Tanaman Industri (HTI)* (Anonim 2007).

Plantations can be developed in non productive state forest or in community forest. In community forest develops agroforestry system. This system can produce another crops before the forest crops (wood) harvested. The kinds of plants that can be planted are fast and slow grows plant through the expectation value of land (Iskandar 1999).

a. Industrial Plantations

Industrial plantations is a wide area which is planted by homo gen plantations (include wood). This industry plantations can be a forest that can be exploited without reaching natural forest. Ismail (2010) argued, the cultivation of plantations needs small field, more productive and cheap than natural forest, but there is no replacement from natural forest to forest plantations to keep the ecosystem. Therefore, forest plantations need to revitalize.

Industrial plantations can be developed by agroforestry approach. One of the definitions of agroforestry is a land sustainable management system which increasing forest production and combining forest production (trees)and forest plantations and animals in the same field and applying appropriate management actions in society (KFS, King dan MT Chandler, ICRAFT in Lahjie, 2004).

b. Plantations Revitalization

Krisnamukti (2005) stated that forest revitalization has 3 definitions. First, forest revitalization is the awareness of forest in our life. Second, revitalization as the expectation of forest in future. Third, the understanding of the policy and strategy of revitalization of the conduct "revitalization". the revitalization is a form of awareness to put back the importance of the empowerment of agriculture, fisheries, forestry, plantation increase the production capability, engine performance, quality timber production, forestry product diversification, increased competitiveness and the welfare of workers, the development of forest-based industries as well as the handling of International Trade .

c. Expectation Value of land

Davis (1954) stated that the expectation value of the land is a land value of assets or capital. Favor by calculating the expected value of land as a measure of the rotation is the focused on the attention to the influence of time on revenues and expenditures for the return of an investment. A logical approach for the enterprise. Land and stands on top of a growing capital base in the forest businessmen. Because investment in forestry is very expensive, relatively permanent which is entirely the responsibility of the owner of the capital value of land and its standing is very important.

2. RESEARCH METHODOLOGY

Analysis of the data used to calculate the potential stand,by using the increment analysis.It calculated the average annual increment (mean annual increment)and the average annual increment runs (Current annual increment). The data that had been collected were then financial analyzed with 1 USD = Rp. 9.800 as follows:

a. Payback Period (PP).
b. Net Present Value (NPV)
c. Net Benefit Cost Ratio (Net B/C)
d. Internal Rate of Return (IRR)
e. Equivalent Annual Anuity (EAA)
f. Minimum Accestability Rate (MAR)
g. Expectation value of Land

3. FINDINGS AND DISCUSSIONS

A. GENERAL VIEWS OF EAST KALTIM

East Kalimantan province on Borneo island is flanked by three other Provinces, namely South Kalimantan, West Kalimantan and Central Kalimantan bordering Malaysia State (State of Sabah and Sarawak). Covers an area of 208.657.74 km2 with details 198.441.17 km2 land and sea (0-12 miles) 102.16.57 km2. Its location is at 113º4 'east longitude, 119º00' West Longitude and 4º24 'North latitude and 2º25' south latitude. East Kalimantan forest area are14.6 million hectares. It is divided into 4 functions. 1. As conservation, forest nature reserve,forest national park, and forest nature park. 2. Protected forest, 3. limited production forest, 4.unlimited production forest.

Before 1980s was 19.89 million hectares. Today, it decreased in 14.6 million hectares. It caused cultivation, fire, land speculation, illegal logging. They changed the forest functions from forest cultivation area (KBK) to non forest cultivation area (KBNK). The degradation quality of KBK is 2 million hectares (anonym, 2006).

The rate of economic growth in east Borneo in 2004 was 1.7% in oil and gas. Non oil was 6.96%. It showed on gross domestic production (PDRB).Coal(38.89%),farming(6.16%),processing industry(37.53%) was dominated in shaping regional gross domestic production (PDRB), while non oil was dominated by coal (26.4%), farming (16.9%), trading, hotel and restaurant (15.46%), transportation and communication (9.14%).

B. STAND VOLUME INCREMENT

1. Meranti stand volume increment (*S. leprosula*)

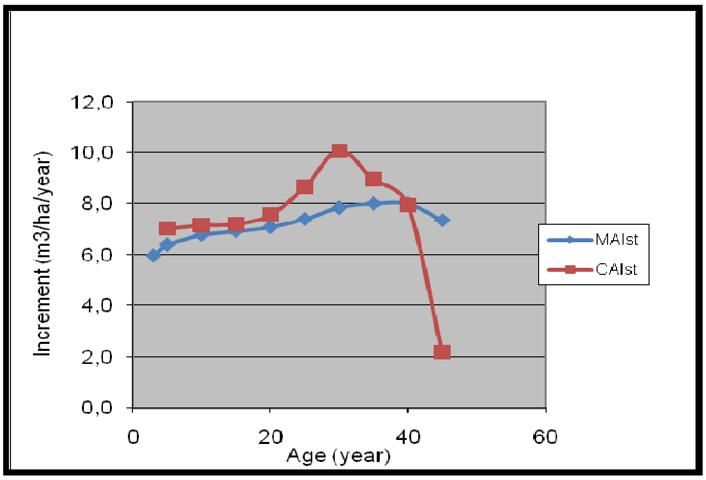
The increasing of stand volume increment applied the law of dis-minishing return. The calculation of production wood in the end of recycling should do time series. it finds the production curve shape.

Tabel 1. *S. Leoprosulas*'s resident PT. Inhutani

Age	n	d	h	TV	MAIst	CAIst
year		cm	m	m^3/ha	m^3/ha/year	m^3/ha/year
3	480	11.0	7.0	18	6.0	
5	460	14.0	8.2	32	6.4	7.0
10	340	22.0	9.7	68	6.8	7.1
15	320	26.5	11.3	104	6.9	7.2
20	300	31.0	12.5	141	7.1	7.6
25	280	35.0	14.0	185	7.4	8.7
30	260	40.0	15.0	235	7.8	10.1
35	230	45.4	16.0	280	8.0	8.9
40	200	50.0	17.7	320	8.0	7.9
45	180	53.0	18.5	330	7.3	2.2

descriptive:
TV: Total volume
n: numbers of tress per hectare
MAI : Mean Annual Increment (m^3/ha/year)standing stock
CAI: Current Annual Increment (m^3/ha/year)standing stock.

From Table 1, it can be seen that the meranti at District Long Nah expected to be harvested at the age of 40 years (economic cycle) and has a total volume of 320m^3/ha and increment of 8.0 m^3/ha/year with an average diameter of 50 cm and an increase of the average diameter of1.25cm/ year. Meanwhile, according to the technical cycle, timber can be harvested at the age of 35years with a magnitude of 8m^3/ha/year increment and total volume of 280m^3/ha/year but not financially lucrative. Then meranti should be harvested at age 40. Graphic the average increment can be seen in the picture below.



Picture 1. MAI and CAI S.leprosula in Long Nah resident

Increment increased from 3 years to 40 years old and suffered increment intersection at the age of 40 years. Meanwhile, after 40 years, MAI and CAI standing stock decreased. From the chart, it can be seen that the reduced population of timber tree stand per hectare at age 5, 10, 15, 20 and 25 years due to natural death row by 0.74, 8.33, 3.98, 6.48, 9.43 m3/ha after the age of 30 and 35 were the result of thinning and harvesting the crop were 235 m3/ha and 280 m3/ha. It estimated that meranti can reach the highest increment in 50 cm diameter of the largest timber harvest in 40 years with a volume was 320 m3/ha. The tree height increment is 17.7 meters and an annual average standing stock was 8.0 m3/ha/year.The maximum age of meranti was 40.

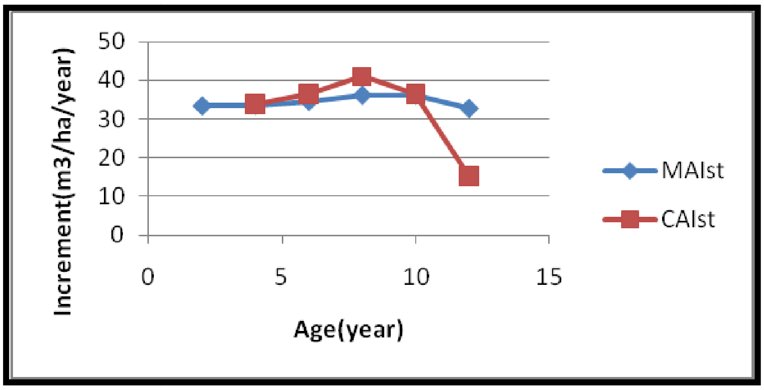
2.Stand volume increment of Sengon *(P.falcataria)*

Sengon's volume projections can be seen in Table 2.

Table 2. Volume of Sengon (P.falcataria) at PT Belantara Subur East Kalimantan Province.

Age	n	d	h	TV	MAIst	CAIst
Year		cm	m	m^3/ha	m^3/ha/year	m^3/ha/year
2	1000	15,0	7,0	67	33,4	
4	950	20,0	8,5	134	33,6	33,8
6	900	24,0	9,8	207	34,6	36,5
8	850	27,8	11,0	289	36,2	41,0
10	800	31,0	12,0	362	36,2	36,4
12	750	33,0	12,5	393	32,7	15,3

From Table 2, it can be seen that Sengon in PT Belantara Subur is expected to be harvested at the age of 10 years according to the economic cycle and it has a total volume of 362m^3/ha and the average diameter is 31 cm and the increasing of the average diameter was 3.1 cm / year. Meanwhile, according to the technical cycle, Sengon can be harvested at age 8 with the increment was 36.2 m^3/ha/year and total volume is 289m^3/ha.
The annual increment graphic average can be seen in Picture 2.



Picture 2. MAI and CAI *P.falcataria* in PT. Belantara Subur

Increment volume average experiencing increased in starting age 2 years until age of 6 years, whereas after age 6 years, MAI and CAI experiencing decreased. From the graph above, it can be seen that the diminished population of residual stand sengon per hectare on age 4, 6 and 8 years old caused due natural death consecutive by 3.3, 7.1 and 11.5 m^3/ha. as well as the estimated to stands of sengon which achieved the riap highest with the diameter biggest wooden was 31 cm in the year felling aged 10-year with a volume was 362m^3/ha, tree height was 12 meter and increment annual average standing stock sengon was 36.2m^3/ha/year.

3.Stand Volume increment of *A.mangium*

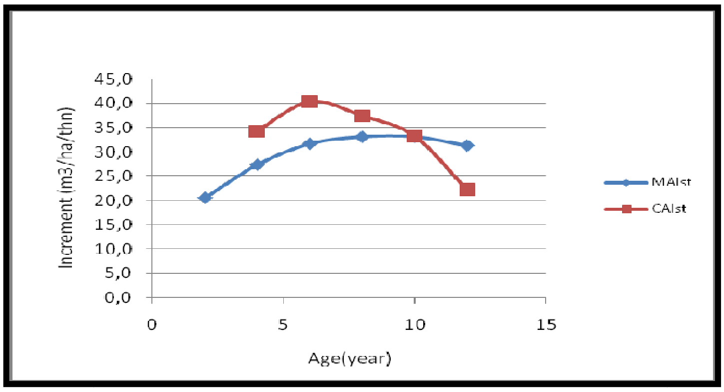
Projected volume in PT.Sinar Mas acacia wood can be seen in Table 3.

Table 3. Volume *Acacia mangium* PT.Sinar Mas.

Age Year	N	d cm	h m	TV m^3/ha	MAIst m^3/ha/year	CAIst m^3/ha/year
2	1150	9,0	8,0	41	20,5	
4	1080	13,0	11,4	109	27,4	34,2
6	972	16,5	14,3	190	31,7	40,3
8	875	19,7	16,3	265	33,1	37,5
10	750	23,5	17,0	332	33,2	33,3
12	600	28,0	18,0	376	31,4	22,3

Based on table 3, It can be seen that the acacia in PT.Sinar Mas is expected to be harvested at the age of 10 years (economic cycle) and had a total volume of 332m^3/ha with an average diameter was 23.5cm and the increasing of the average diameter was 2.35cm / year. While technically *acacia* cycle can be harvested at the age of 8 years with a total volume was 265m^3/ha although financially not profitable yet. So *acacia* should be harvested at the age of 10 years.

Average increment graphic can be seen in Picture



Picture 3. MAI and CAI *A.mangium* in PT. Sinar Mas.

Average volume increment increased from age 2 years to 8 years, while after the age was 8 years, also MAI and CAI decreased. From chart, it can be seen that the reduction in the population of stands acacia per hectare at age 4, 6 and 8 years due to natural mortality, respectively for 2.49; 10.94 and 18,97 m^3/ha and it is expected the acacia stand achieved the highest increment in the largest 23.5cm diameter timber which harvesting in 10-year-old with volume was 332m^3/ha, tree height was 17 meters and the average annual increment of standing stock acacia was 33.2m^3/ha/year.

4. Stand volume increment of *Eucalyptus deglupta*

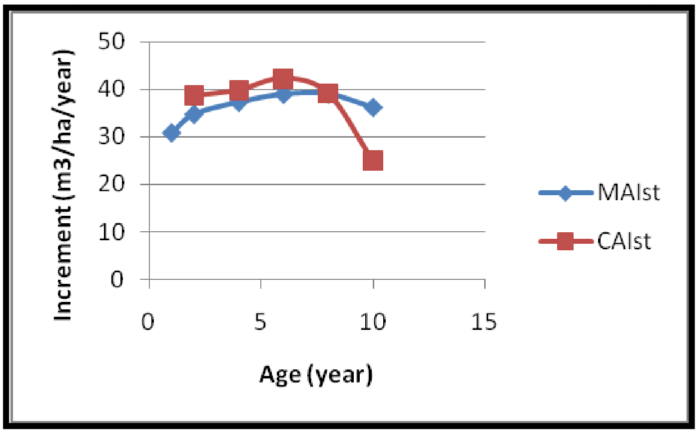
Leda timber volume projections in PT.Sinar Mas can be seen in Table 4.

Table 4. Volume *E.deglupta* in PT.Sinar Mas.

Age	n	d	h	TV	MAIst	CAIst
Year		cm	m	m^3/ha	m^3/ha/year	m^3/ha/year
1	1600	7.0	6.7	31	30.9	
2	1333	10.0	9.5	70	34.8	38.7
4	1067	14.3	13.4	149	37.3	39.8
6	853	18.5	17.0	234	39.0	42.3
8	683	23.0	20.0	312	39.0	39.1
10	550	27.0	23.0	362	36.2	25.0

From table 4, it can be seen that *E.deglupta* in PT. Sinar Mas was expected to be harvested at the age of 8 years (economic cycle) and it had total volume 312 m3/ha and the average diameter was 23 cm and the increasing of the average diameter was 2.88 cm / year.

Graph the average increment can be seen in the picture below.



Picture 4. MAI and CAI *E.deglupta* in PT. Sinar Mas

Average increment increased from age 2 years to 6 years, while the age of 6 years after MAI and CAI decreased. From the chart above, it can be seen that the reduced population stands of *E.deglupta* per hectare at age 4 and 6 years due to a natural death row was 13.89 and 29.92m^3/ha, while stands of *E.deglupta* expected to reach the highest increment with a diameter was 23 cm in the largest timber felling in 8-year-old with a volume was 312m^3/ha, tree height was 20meters and an average annual increment of standing stock *E.deglupta* was 39m^3/ha/year.

5. Stand Volume increment of *Switenia macrophylla*

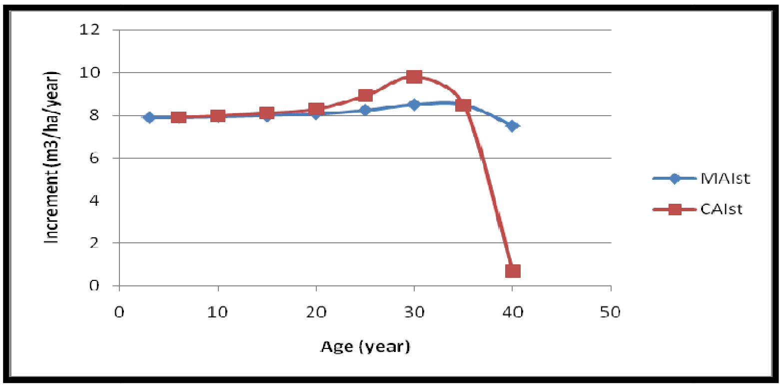
S.macrophylla timber volume projections in PT.Inhutani I can be seen in Table 5.

Table 5. Volume *S.macrophylla* in District Long Nah PT.Inhutani I

Age Year	N	d cm	h m	TV m^3/ha	MAIst m^3/ha/year	CAIst m^3/ha/year
3	700	11.3	4.5	24	7.89	
6	600	15.8	5.6	47	7.90	7.91
10	550	19.5	7.0	79	7.93	7.97
15	500	22.5	9.0	120	7.99	8.10
20	450	26.5	10.0	161	8.06	8.29
25	400	31.0	11.0	206	8.23	8.91
30	350	36.5	12.0	255	8.49	9.79
35	300	42.0	13.0	297	8.49	8.45
40	280	45.0	13.5	300	7.51	0.68

From Table 5 it can be seen that *S.macrophylla* in District Long Nah expected to be harvested at the age of 35years (economic cycle) and has a total volume of 297m^3/ha with an average diameter of 42cm and an increase of the average diameter of 1.2cm / year.

Graphs average annual and running see in Picture 5.



Picture 5. MAI and CAI *S.macrophylla* in Long Nah District

Mean annual increment (MAI) standing stock increased from age 3 years to age 30 years, whereas after the age of 35 years has decreased. From the above chart it can be seen that the reduced population per hectare stands of mahogany in 6,10,15 and 20 years of age due to natural death row were 3.38, 3.95, 7.21 and 11.98 m^3/ha stands of mahogany and it is expected to reach the highest increment to the largest was 42cm diameter. The timber harvesting in 35-year-old with a volume was 297m3/ha, tree height was 24.5meters and an average annual increment of the standing stock of mahogany was 8.49m^3/ha/ year.

6. Stand volume increment of *Gmelina arborea*

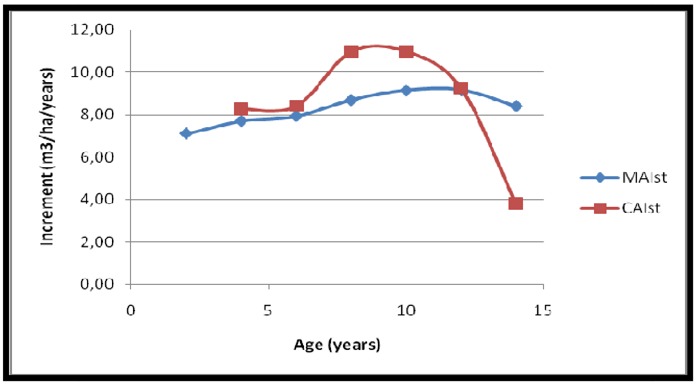
G.arborea timber volume projections in PT.Inhutani I can be seen in Table 6.

Table 6. Volume *G.arborea* in District Long Nah in PT.Inhutani I

Age	n	d	h	TV	MAI	CAI
Year		cm	m	m^3 /ha	m^3/ha/year	m^3/ha/year
2	465	8.8	6.7	14	7.10	
4	432	12.0	9.0	31	7.69	8.28
6	402	14.5	10.7	48	7.93	8.40
8	374	17.0	12.6	69	8.69	10.96
10	325	20.0	14.0	91	9.14	10.97
12	250	24.3	15.3	110	9.16	9.25
14	200	27.7	16.0	118	8.40	3.82

From Table 6, it can be seen that in the District of Long Well *G.arborea* expected to be harvested at the age of 12 years (economic cycle) and had a total volume of 110m^3/ha/year with an average diameter was 24.3cm and accretion rate average diameter was 2.03cm / year. Meanwhile, according to the company (technical cycle), *G.arborea* can be harvested after 10 years, but after the financial calculations have not been profitable. *G.arborea* can be harvested at the age of 12 years.

Graphic average annual and run see in Picture 6.



Picture 6. MAI dan CAI *G.arborea* in Long Nah District

Mean annual increment (MAI) has increased from age 2 years to age 10 years, whereas after age 10 years, MAI and CAI decreased. From the above chart it can be seen that the reduction in the population stands of *G.arborea* per hectare at age 4, 6 and 8 years due to a natural death row by 1.01; 2.14 and 3.31 m^3/ha and it was expected the stand of *G . arborea* achieved the highest increment in diameter 24.3 cm. It was biggest timber harvesting in 12-year-old with a volume of 110 m3/ha, tree height was 15.3 meters and the increasing of the average annual increment of standing stock *G.arborea* was 9.16 m^3/ha. For all, the prognosis research plots can be seen in Table 7.

Table7. Prognosis Plot Research by Recycling Economical In Various Stands.

Plot Sampel	**Cycle (year)**	**d (cm)**	**h (m)**	**TV (m^3)**	**MAI (m^3/ha/ year)**	**types of stand**
S.leprosula	40	50	17,7	320	8.00	Slow
P.falcataria	10	31	12	362	36.20	Fast
A.mangium	10	23,5	17	332	33.20	Fast
E.deglupta	8	23	20	312	39.00	Fast
S.macrophylla	35	42	13	297	8.49	Slow
G.arborea	12	24,3	15,3	110	9.16	Slow

According to the economic cycle of the table above, it can be explained in a row that the stands that had an average annual increment was the biggest concession by 39m^3/hektar/year. *E.deglupta* was the 8-year cycle; concession P.falcataria was 36,2 m^3/ha/year with 10-year cycle; utilization by 33.2m^3/ha/year, *A.mangium* for the 10-year cycle; *S.leprosula* of 8.0 m^3/hektar/year the 40-year cycle, exploitation *S.macrophylla* by 8.49m^3/hektar/year and G.arborea at 9.16m^3/hektar/year. From the data above it can be concluded that the production / maximum increment of stands of fast-growing species (*A.mangium, P.falcataria,* and *E.deglupta*) at age 10 years had a greater increment of 15m^3/hektar/year, while stands of slow growing (*G.arborea, S.leprosula* and *Switenia*) had smaller increment of 15m^3/hektar/year.

C. FINANCIAL ANALYSIS OF INCREASING HOPE LAND VALUE THROUGH THE FOREST

1. Revitalization in East Kalimantan Province: Analysis of Financial Standing Meranti (*S.leprosula*) according to the Economic Cycle

The initial investment was Rp.42.136.000 for meranti concession, while the total cost for the entire timber tree planting activities for 40 years was Rp.136.754.000 and gross revenues was Rp.555.275.000.While the business had the value of the benefit (B / C Ratio) was 4.06.

The harvest time of Meranti timber can be done at the age of 30, 35 and 40 years with a sale price was Rp.600,000/m^3, with a volume was 267, 300 and 314 m^3. It earned income, respectively for Rp.156.275.000, Rp.186.200.000 and Rp.212.800.000, while the price of meranti wood that is used as firewood originating from meranti crop residues with Rp.50.000/m3. The information can be explained that the interest rate was 5%, Net Present Value (NPV) and Net B / C was Rp.54.953.000 and 2.89. This statement is reinforced by the analysis of models of the Internal Rate of Return (IRR) with a value was 9% and the average income per year (EAA) was Rp.3.202.560. The results showed, that the stands of meranti with an interest rate of 5% according to the economic cycle and technically was feasible to be developed because it was positive and greater than the Minimum Accestability Rate (MAR = 4.5%).

2. Analysis of Financial Exploitation *Acacia mangium* by Economic Cycle

Initial investment concession A. mangiun was Rp.8.434.000, while the total cost for the entire planting *A.mangium* for 10 years was Rp.57.053.000 and gross revenues was Rp.157.400.000, while the business had the value of the benefit (B / C Ratio) was 2.8.

The harvesting time of *A. mangium* stands can be done since the age of 6, 8 and 10 years with a sale price of 200.000/m^3 and the income obtained respectively were Rp.38.000.000; Rp.53.000.000 and Rp.66.400.000.While, the wood of *A.mangium* were used as firewood. It is from the remnants of timber that is not used.The sales price was Rp.50.000/m^3. The information can be explained that the cycle life was 10 years at an interest rate of 10%, Net Present Value (NPV) and Net B / C of Rp.60.575.000 and 3.43.This statement was reinforced by the analysis of models of the Internal Rate of Return (IRR) with a value was 27.6% and the average income per year (EAA) was Rp.7.844.740.

The results showed, that the stands of *A.mangium* at an interest rate of 5% according to the economic cycle and technically was feasible to be developed, because it was positive and greater than the Minimum Accestability Rate (MAR = 4.5%).

3.Analysis of Financial Exploitation Sengon (*P.falcataria)* according to the Economic Cycle

The initial investment for sengon concession was Rp.25.997.000. While the total cost for the entire planting sengon for 10 years was Rp.66.652.000 and gross revenues was Rp.214.500.000. While, the business had the value of the benefit (B / C Ratio) was 3.2.

The harvesting time of sengon can be done at the age of 6, 8 and 10 years with a sale price of 250.000/m^{3}w ith the amount of income, respectively for Rp.51.750.000; Rp.72.250.000and Rp.90.500.000.The price of sengon while its used as firewood from the rest can be sold was Rp.50.000/m^3.The information can be explained that the 10-year cycle, and at an interest rate of 5%,sengon had Net Present Value (NPV) and Net B / C was Rp.91.998.000 and 4.56. This statement is reinforced by the analysis of models of the Internal Rate of Return (IRR) with a value of 33.2% and the average income per year (EAA) was Rp.11.914.162.

The results showed that the stands of sengon at an interest rate of 5% according to the economic cycle and the cycle technically was feasible to be developed because it was positive and greater than the Minimum Accestability Rate (MAR = 4.5%).

4. Analysis of Financial Exploitation *Eucalyptus deglupta* by Economic Cycle

Initial investment concession *E. deglupta* was Rp.19.099.000. While the total cost for the entire planting *eucalyptus deglupta* for 8 years was Rp.43.240.000 and the gross revenues was Rp.86.875.000. The business value of the benefit (B/C Ratio) was 2 .

E.deglupta can be harvested at 4, 6 and 8 years with a sale price of 125.000/m^3. The value of revenue, respectively were Rp.18.625.000; Rp.29.250.000, and Rp.39.000.000. From the statement can be explained that the age of 8 years. The interest rate of 5% has a Net Present Value (NPV) and Net B / C of Rp.27.405.000 and 2.35.

This statement was reinforced by the analysis of models of the Internal Rate of Return (IRR) with a value of 24.4% and the average income per year (EAA) was Rp.4.240.151. The results showed that the exploitation *E.deglupta* at an interest rate of 5% according to the economic cycle and the cycle technically was feasible to be developed because it was positive and greater than the Minimum Accestability Rate (MAR = 4.5%).

5. Analysis of Financial Exploitation *Swetenia macrophylla* According to Economic Cycle

The initial investment for mahogany concession was Rp.38.341.000. While the total cost for the entire planting mahogany for 35 years was Rp.100.836.000 and the gross revenues was Rp.340.050.000. The business had the value of the benefit (B / C Ratio) was 3.4.

Mahogany trees may be harvested from the age of 25, 30 and 35 years with a sale price of Rp.400.000/m^3. The value of revenue, respectively were Rp.91.670.000, Rp.114.750.000, and Rp.133.630.000. While the price of the rest of mahogany that was not used was Rp.50.000/m^3. The information can be explained that the mahogany with 35-year cycle was 5% interest rate. The value of the Net Present Value (NPV) and Net B / C was Rp.35.694.000 and 2.23.

This statement was reinforced by the analysis of models of the Internal Rate of Return (IRR) with a value of 8.6% and the average income per year (EAA) was Rp.2.179.894. The results showed that the exploitation of *S.macrophylla* with the interest rate of 5% according to the economic cycle and the cycle technically was feasible to be developed because it was positive and greater than the Minimum Accestability Rate (MAR = 4.5%).

6.Financial Exploitation Analisis *Gmelina arborea* According Economic Cycling

The initial investment for Rp.26.307.000 *G.arborea* concession, while the total cost for the entire planting *G.arborea* for 12 years was Rp.44.507.000. The gross revenues was Rp.64.800.000 and the business benefit value (B / C ratio) was 1.5.The harvesting time of *G.arborea* can be done at the age 8,10 and 12 year. The selling price of wood at Rp.240.000/m^3, respectively for Rp.16.560.000; Rp.21.840.000 and Rp.26.400.000. The information that can be explained by recycling *G.arborea* 12 years at an interest rate of 5%,Net Present Value (NPV) and Net B / C, respectively was Rp.4.685.000 and 1.19. This statement was reinforced by the analysis of models of the Internal Rate of Return (IRR) with a value of 7.4%.From the data showed that the exploitation *G.arborea* at an interest rate of 5% by recycling economically was feasible to be developed because the value was greater than the Minimum Accestability Rate (MAR = 4.5%). Meanwhile, according to the technical cycle, the operation was not viable because NPV of *G.arborea* was negative and Net B / C was less than 1 and the value of IRR was less than the Minimum Rate Accestability. The company was still seeking plants in the sense of not immediately cut to the end that no private land was taken by the local community as well as the ownership of the land boundary between the companies and the local community yet.

Broadly speaking concession plants can be divided into two, according to the company (technical cycle) and financial analysis (economic cycle). The difference lies in the recycling business had generated and the amount of increment. The analysis can be seen in Table 8.

Table 8. Recapitulation of Forest Plantation Financial Analysis by Company (Technical Cycling)

Stand		**NATURAL RESOURCES**			**Financial - DF 5 %**				
No	Types	Technical Cycling (year)	MAI	TV	PP	NPV	NET B/C	EAA	IRR
			M^3/ha/ year	M^3	Years	Rp		Rp	%
1	*S.leprosula*	35	8.00	280	29.4	24.102 .000	1.84	1.472.000	7.5
2	*P.falcataria*	8	36.20	289	7	39.081.000	2.56	6.046.683	24.5
3	*A.mangium*	8	33.10	265	5.1	22.250.000	1.93	3.442.560	18.4
4	*E.deglupta*	6	39.00	234	6	4.155.000	1.22	818.608	10.0
5	*S.macrophy lla*	30	8.49	255	24.7	11.573.000	1.41	752.840	6.7
6	*G.arborea*	10	9.14	91	7.2	(8.368.000)	0.66	(1.083.694)	-

From Table 8, it can be concluded that there was one type of concession stands by recycling unfavorable technical / non-viable *G.arborea*.These statements was based on the negative of net value and preset Value Net B / C which was less than one. It was influenced from the cycle of exploitation and magnitude increment. This means that the operation was not feasible to *G.arborea* cultivated as annual increment growth. It also showed the total volume was very small and it was also influential in financial analysis and company should not conduct harvesting at the age of 10 years.

If it was seen from the data, the *E.deglupta, P.falcataria, S.macrophylla, and S.leprosula*, according to the company's version (technically recycled) with a cycle as specified in the table above were feasible for cultivated crops, that was supported by value positive financial.Meanwhile, according to the version of financial (economic cycle) that we have done in the field of financial analysis. It can be seen in Table 9.

Table 9. Financial Analysis of Forest Plantations (Economic Cycle)

STAND		**NATURAL RESOURCE**			**ECONOMIC - DF 5%**				
No	Stand	Economic Cycle (year)	MAI	TV	PP	NPV	Net	EAA	IRR
			M^3/ha/ y	M^3	year	Rp	B/C	Rp	%
1	*S.leprosula*	40	8.00	320	29.4	54.953.000	2.89	**3.202.560**	9.0
2	*P.falcataria*	10	36.20	362	7	91.998.000	4.56	11.914162	33.2
3	*A.mangium*	10	33.20	332	5.1	60.575.000	3.43	7.844.740	27.6
4	*E.deglupta*	8	39.00	312	6	27.405.000	2.35	4.240.151	24.4
5	*S.macrophyll a*	35	8.49	297	24.7	35.694.000	2.23	**2.179.894**	8.6
6	*G.arborea*	12	9.16	110	7.2	4.685.000	1,19	528.587	7.4

From Table 9, it can be explained that according to the economic cycle, all kinds of stands worth the effort. It can be seen from the financial indicators. Besides all kinds of stands can be harvested according to economic cycles and had a greater increment and harvesting cycle is longer than technical.

From Table 9 above, the stands that had the highest financial value in a row were *P.falcataria, A.mangium, E.deglupta, S.leprosula, S.macrophylla and G.arborea.* According to the recent economic cycle, *G.arborea* was feasible to be developed because it had a greater increment and harvesting cycle that was longer than the technical, then according to the economic cycle, *G.arborea* worth the effort. While, the average annual income (EAA) according to the technical cycle and economic cycle, the highest row were *P.falcataria, A.mangium, E.deglupta, S.leprosula, Switenia machrophylla,* and the smallest was *G.arborea*.

D. WILLINGNESS PAY FOR LAND OF FOREST LAND REVITALIZATION IN EAST KALIMANTAN PROVINCE

The expected value of concession plantation stands both in terms of the technical cycle (according to the company) or the economic cycle (financial) can be seen in Table 10.

Table 10 is the value expectations and concession stand plantation in East Kalimantan province in terms of recycling technical.From Table 10 it can be explained that the expectation value of the land according to the technical cycle stands *P.falcataria* had the largest land expectation value was Rp.39.027.000 for 8 years.

The second rank was *A.mangium* for Rp.22.241.000 for 8 years. Whereas the third rank was *E.deglupta* exploitation of Rp.4.274.000 for 6 years with an index of 14.59%. *S.leprosula* was the fourth land that has the expectation value of Rp.24.066.000 for 35 years with an index of 14.08%. *S.macrophylla* was the fifth concession land that produced the expected value of Rp.11.542.000 for 30 years, and the sixth was *G.arborea* which conscession was 10-year cycle that has produced negative expectation value for land Rp.8.379.000. While every year required subsidies from the government was Rp.838.000. From the data above it can be concluded that *G.arborea* produced a negative expected value of land resulting from the company and the benefit too low set a rather high fees so it did not proportional.

Moreover, *G.arborea* unfit for cultivated because it had a small increment and a shorter cycle.This was a support of the increment of slow growth and financial analysis was not feasible.

Obligations to be paid by the company to the government (taxes) according to the technical cycle can be seen in Table 10.

Table 10. Land Value Tax Expectations by Technical Cycling

No	Types	cycle (year)	WPL/Ha	Tax	Notes (Grow)
1	*S.leprosula*	35	24.066.000	12.893	Slow
2	*P.falcataria*	8	39.072.000	20.280	Fast
3	*A.mangium*	8	22.241.000	18.790	Fast
4	*E.deglupta*	6	4.274.000	5.479	Fast
5	*S.macrophylla*	30	11.542.000	6.789	Slow
6	*G.arborea*	10	(8.379.000)	(21.249)	Slow

Descriptive :

WPL : Willingness Pay For Land

From Table 10, it can be seen that the tax to be paid by the company to the government according to the technical cycle at each stand ranged between Rp.5.500/ha to Rp.20.000/ha. As for the stand *G.arborea* was not feasible to be developed according to the technical analysis of the financial cycle that negative land value expectations.While the expectation value of the land financially (economic cycle) can be seen in Table 11.

Table 11. Value Expectations Land Concession Stand Plantation in East Kalimantan province in terms of Economic Cycle.

No	Stand	Cycle	WPL/Ha	WPL/Ha/ Year	Notes (Grow)
1	*S.leprosula*	40	54.912.000	1.372.800	Slow
2	*P.falcataria*	10	91.987.000	9.198.700	Fast
3	*A.mangium*	10	60.564.000	6.056.400	Fast
4	*E.deglupta*	8	27.396.000	3.424.500	Fast
5	*S.macrophylla*	35	35.658.000	1.018.800	Fast
6	*G.arborea*	12	4.672.000	389.333	Fast

From Table 11 can be explained that the expectation value of the land according to the economic cycle for all types of stands had different expectation value. Where the exploitation *P.falcataria* had the largest land expectation value. The smallest hope of land was *G.arborea* and *P.falcataria* to produce a cycle of 10 years of Rp.91.987.000 land expectation value, then every year produced Rp.9.198.700.

A.*mangium* with Rp.60.564.000 10-year cycle, each year produces Rp.6.056.400. E.deglupta the 8-year cycle produces Rp.27.396.000, then every year produces Rp.3.424.500. *S.leprosula* with 40-year economic cycle produces Rp.24.066.000 expectation value of the land. It annually generated in Rp.1.372.800. *S.macrophylla* cycle of 40 years which have turned out to generate Rp.35.658.000 land expectation value, with each year producing Rp.1.018.800, and *G.arborea* 12-year cycle that has produced the expected value of Rp.4.672.000 land, then every year produce the expected value of Rp.389.333 land. This is in contrast with the technical cycle that generates negative expected value of land.This due, though technically increment recycled of G.arborea was optimal, but it is not economically profitable, and this can be evidenced by the positive expected value of land.Obligations to be paid by the company to the government (taxes) according to the economic cycle can be seen in Table 12.

Table 12. Expected Values of Land Tax by Economic Cycle

No	Stands	Recycle	WPL/Ha	Tax	Notes (Grow)
1	*S.leprosula*	40	54.912.000	25.740	Slow
2	*P.falcataria*	10	91.987.000	38.116	Fast
3	*A.mangium*	10	60.564.000	40.841	Fast
4	*E.deglupta*	8	27.396.000	26.342	Fast
5	*S.macrophylla*	35	35.658.000	18.009	Slow
6	*G.arborea*	12	4.672.000	9.801	Slow

From Table 12, it can be seen that the tax to be paid by the company to the government according to the economic cycle at each stand ranged between Rp.10.000/ha to Rp.41.000/ha. For companies seeking type stands *P.falcataria* must pay taxes to the government about Rp.40.000/ha.

As for the stand of *A.mangium* around Rp.41.000/ha. Taxes for this kind of stands around S.leprosula Rp.26.000/ha. Stands for the type of tax and *E.deglupta S.macrophylla* around Rp.26.000/ha and the smallest was the type of tax that was about Rp.10.000/ha *G.arborea.*The plantation revitalization can be concluded that firms have to pay taxes to the government based on the expected value of land was 15% (per standing unit) . As a plant tax to be charged on the selling price of the wood.

E. CONCLUSIONS AND RECOMMENDATIONS

A.CONCLUSIONS

1. Types of plants growth rapidly (*Paraserianthes falcataria, Acacia mangium and Eucalyptus deglupta*) at age 10 years had a greater increment of 15 m^3/ha/year, while the plants that was growing slowly *(Switenia macrophylla, Shorea leprosula and Gmelina arborea)* had a more luxuriant smaller than 15 m^3/ha/year.
2. Increment every kind of plant affects the value of varies financially.
3. Financially, according to the technical cycle, all plants except cultivated feasible for *Gmelina arborea*, are according to the economic cycle, all types of plants cultivated as feasible to have a value greater than the Minimum IRR Accestability Rate (MAR = 4.5%).
4. Fast output of the plant species of land has a value greater expectations than slower growing plants, which according to the technical cycle, *Gmelina arborea* has a negative expected value of land, while according to the economic cycle, *Paraserianthes falcataria* expectation value of land has the greatest, while the smallest is *Gmelina arborea.*
5. Revitalization of plantations will provide the potential for the government tax to be paid by the company based on the expected value of each type of crop land by 15% (per unit) as a plant which will further tax is charged on the selling price of the wood.
6. Plantation revitalization undertaken by companies, governments and communities can be a source of revenue for the company (profit), government (revenue) and society (income) in both the short term and in the long term. Based on the calculation of the economic cycle provides a higher income than the technical cycle.

B. SUGGESTIONS

1.Types of fast growing plants to be planted in order to be prioritized, because in addition to having a better commercial value, are also very much needed by the wood processing industry.
2.Forest plants to be more developed than all types of plants to use on vacant land and a former coal mining area.
3.Timber plants for the wood processing industry of raw materials and carpentry tools can be a substitution of natural forest timber dwindling existence.To meet the raw material needs of the timber industry plantation revitalization program through increased land value expectations need to be developed.
4. Plantation management makes it more economical consider to recycling as it will give a higher income on all types of plants than the technical cycle, unless there are certain considerations that requires the use of the technical cycle.Given plantations have strategic value in saving natural forests, the government's role in the revitalization of these plantations have developed one of them in the form of subsidized financing.

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