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ANALYSIS BIOECONOMY, GROWTH AND RECOVERY STANDS FELLING FORESTS BASED ON LOCAL WISDOM IN PENAJAM PASER UTARA REGENCY EAST KALIMANTAN PROVINCE

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ABSTRACT

The purpose of this research are 1) to find out the increment of former forest of dipterocarpaceae and non dipterocarpaceae, 2) to know the increment of dipterocarpaceae as recovery plant at PT ITCI Kartika Utama, East Kalimantan Province, RSSI or Indonesia restoration silvicultural system as a method. The object of this research are the increment of dipterocarpaceae and non-dipterocarpaceae, while as the recovery plant is *Shorea johorensis* (plot A) and *Dryobalanops aromatic* (Plot B). The research method used theory production and increment (CAI and MAI). The data got since 2004. It was at the age 10 years while conducted predictions and simulation at the age 50 years. Simulation and production analysis used linier regression method. The result of this research showed increment od dipterocapaceae is 1.33 m³/ha/y (plot A),1.28 m³/ha/y(plot B), and the increment of non dipterocarpaceae is 1.49 m³/ha/y (plot A),1.36 m³/ha/y (plot B) at the age 30 years after logging, meanwhile the increment of recovery plant is 3.6 m³/ha/y (plot A), 2.45 m³/ha/y (plot B) at the age 40 as long as cultivation. The value of bioeconomy and the environment based on local wisdom is 35%. It is higher than market price or goverment price license. It means the value of DR and PSDH should be high because market price is not match with refund of environmental services.

Key words: Bio economy, Growth, Logged, Recovery

INTRODUCTION

Nowadays, the world is facing the effect of climate change, population, the rise of green house effect and the less of wood supply. This problems create the solution or science to join biological principle and economical principle or it can be called as Bio economy based on science and science in managing natural resource. This innovations bears benefit which concern on local wisdom and environmental value. The potential of *Shorea johorensis* as the queen of tropical forest production is rare in market. The massive exploitation of this type is caused by the need of wood for construction. The development of this type relays on natural regeneration, short time of fruit grow, and the short seed storage time, they become the barrier for sustainable seed productions. To decrease natural forest pressure, the development of *Shorea johorensis* as the plant that should be done soon. Program development model of forest management units *Shorea johorensis* is expected to be a good program to get a good quality and quantity than natural forest.

METHODOLOGY

This research was conducted at ex PT ITCIKU Penajam Paser Utara, East Kalimantan Province, nowadays, that place as a model of meranti's sustainable forest. The object of this research are increment of dipterocarpaceae and non dipterocarpraceae while the recovery plant is *Shorea johorensis* (Plot A) and *Dryobalanops aromatica* (Plot B). The research method is production theory and increment (MAI and CAI).The data got since 2004. It was at the age 10 years while conducted predictions and simulation at the age 50 years. Simulation and production analysis used linier regression method.

Table 1. The Potential recovery plant *Shorea johorensis* and the benefit value based on the price of biomass (Plot A)

Age (year)	N n/ha	d (cm)	h (m)	TV (m^3/ha)	MAI (m^3/ha/thn)	CAI (m^3/ha/thn)	Benefit Bio/ha	AR Bio	MR Bio
3	320	4.0	5.0	1.67	0.56		20 096 000	12 048 193	
5	270	7.0	6.0	5.05	1.01	1.69	31 156 650	6 172 840	3 272 954
10	250	11.0	8.0	15.01	1.50	1.99	53 968 750	3 596 087	2 290 313
15	200	15.0	11.0	29.92	1.99	2.98	84 780 000	2 833 530	2 066 116
20	190	19.0	13.0	52.50	2.68	4.52	120 438 625	2 294 197	1 579 437
25	180	23.4	14.7	81.89	3.28	5.88	155 401 740	1 897 720	1 189 562
30	170	27.0	16.5	110.76	3.69	5.77	187 363 800	1 691 635	1 107 088
40	150	32.0	18.0	147.59	3.69	3.68	226 080 000	1 531 863	1 051 328
50	140	33.0	19.0	150.08	3.00	0.25	228 482 100	1 522 401	962 736

Table 2. The potential recovery plant of *Dryobalanops aromatic*.and the benefit value based on price environment (Plot A).

Age (year)	n n/ha	d (cm)	h (m)	TV (m^3/ha)	MAI (m^3/ha/thn)	CAI (m^3/ha/thn)	Benefit Bio/ha	AR Bio	MR Bio
3	350	5.0	5.0	2.82	0.94		70 377 424	42 193 510	
5	270	7.8	6.0	6.19	1.24	1.69	71 095 729	14 085 678	212 553
10	260	11.0	8.3	16.19	1.62	2.00	73 448 045	4 894 047	236 170
15	220	14.2	10.5	28.15	1.88	2.39	77 850 450	2 601 930	295 213
20	200	17.0	12.4	42.20	2.11	2.81	86 181 652	1 641 647	369 016
25	190	20.4	13.0	58.10	2.32	3.18	98 232 726	1 199 589	410 018
30	180	23.6	14.0	73.82	2.46	3.14	116 444 069	1 051 328	630 797
40	170	27.0	15.5	98.01	2.45	2.42	155 160 268	1 051 328	1 051 328
50	160	30.0	16.0	113.94	2.28	1.59	158 045 725	1 053 076	1 156 461

Table 3. The benefit value based on biomass price (Plot B)

Age (year)	d (cm)	TV (m^3/ha)	Benefit Bio/ha	AR Bio	MR Bio
3	5.0	2.82	68 687 500	24 390 244	
5	7.8	6.19	84 313 710	13 621 795	4 632 142
10	11.0	16.19	116 745 200	7 209 505	3 241 977
15	14.2	28.15	142 235 720	5 051 957	2 131 074
20	17.0	42.20	168 147 000	3 984 820	1 845 299
25	20.4	58.10	194 730 240	3 351 768	1 671 810
30	23.6	73.82	216 754 200	2 936 287	1 400 893
40	27.0	98.01	237 807 900	2 246 248	870 148
50	30.0	113.94	250 572 000	2 199 074	801 280

Table 4. The benefit value based on environment place (Plot B)

Age (year)	d (cm)	TV (m^3/ha)	Benefit Ling/ha	AR Ling	MR Ling
3	5.0	2.82	38 703 253	13 743 138	
5	7.8	6.19	39 503 312	6 382 189	237 165
10	11.0	16.19	42 139 429	2 602 286	263 516
15	14.2	28.15	45 565 529	1 618 406	286 431
20	17.0	42.20	49 799 374	1 180 167	301 506
25	20.4	58.10	56 025 626	964 334	391 567
30	23.6	73.82	64 233 581	870 148	522 089
40	27.0	98.01	85 287 285	870 148	870 148
50	30.0	113.94	101 920 650	894 478	1 044 178

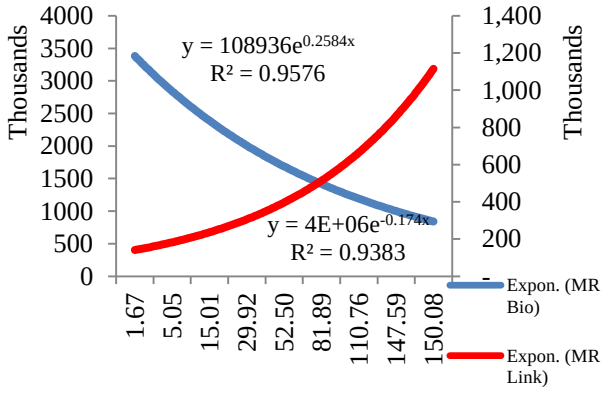
RESULT AND DISCUSSION

The result showed that in Plot A and Plot B the maximal production of Dipterocarpaceae and non dipterocarpaceae reached at the age 50 years or 30 years after logged with the value of CAI and MAI of dipterocarpaceae are 1.33 m³/ha/y and 1.34 m³/ha/y (Plot A), 1.28 m³/ha/y and 1.24 m³/ha/y (Plot B). For non dipterocarpaceae MAI and CAI are 1.49 m³/ha/y and 1.48 m³/ha/y (Plot A), 1.36 m³/ha/y and 1.31m³/ha/y (Plot B) while at the recovery plant at the age 40 years after cultivation with the value of MAI and CAI 3.69 m³/ha/y and 3.68 m³/ha/y (Plot A) can be seen below. The more increment of dipterocapaceae and non dipterocapaceae have bioeconomic value based on the price of biomass and environment of recovery plants of *Shorea johorensis*.

Meanwhile for all the recovery plant of *Dryobalanops aromatica* with MAI value 2.45 m³/ha/y and CAI 2.42 m³/ha/y can be seen below.

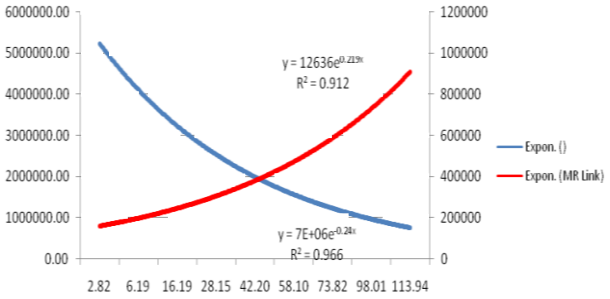
From the Table 2, the price of wood is Rp 1 531 863,- with environmental service is Rp 1 051 328,- meanwhile based on local wisdom the price of wood is Rp 2 583 191,- the difference of the price of wood based on local wisdom is higher than the price market. It is 68%. The intersection can be seen between the price of wood and environment service below.

For the recovery plant of *Dryobalanops aromatica* the benefit of bioeconomy based on biomass price and environment can be seen in the Table 3 and 4.



Picture 1. The curve of the relationship of TV with the benefit value of Bioeconomy. Based on the biomass price and environment service

From Table 3 and 4 above for the recovery plant of *Dryobalanops aromatica* with the price in the market is Rp 2 426 248,- and environment service is Rp 870 148,- meanwhile the wood price based on local wisdom is Rp 3 296 396,- so the difference based on local wisdom is 35%, it is higher than goverment price license or market price. Tht is why DR value and PSDH should be high because price market price is not appropiate with environment service refund. The intersection of wood price and service environment can be seen below.



Picture 2. Curve of the relationship between TV and bioeconomy benefit value based on biomass price and environment service

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