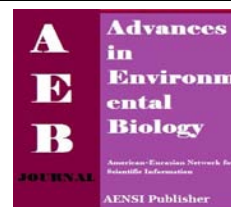




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Regression Analysis on Factors Affected Roundwood Production In Malaysia

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ABSTRACT

Regression analysis was carried out from a study conducted to determine factors that affected the production of roundwood in Malaysia from year 2001 to 2010 based on data from Food and Agriculture Organization (FAO) Statistic online database, Forestry Department Peninsular Malaysia (FDPM), Malaysia Timber Industry Board (MTIB) and International Timber Tropical Organization (ITTO). The data have been collected regarding to roundwood production volume, consumption volume, import and export volume to determine the factors that influenced the roundwood production in Malaysia among of them. The result show that the roundwood production in Malaysia significantly affected by roundwood consumption and import, where the regression models obtain the relationship between roundwood production with roundwood consumption ($p = 0.000$) and roundwood import ($p = 0.021$).

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INTRODUCTION

Malaysia is one of the tropical countries with highest percentages of forested land among developing countries such as Thailand, Philippines and Indonesia with total of forested land in Malaysia for year 2009 statistic is amounted 18.25 million ha or 55.3% and from that amount, about 14.52 million ha are gazette as Permanent Reserved Forest [6]. Production forest is one of two main categories that classified in the Permanent Reserve Forest with an area of about 11.82 million ha, where function to provide sustainable supply of forest and timber products and where commercial harvesting of timber is permitted and economically timber produced for domestic use and export.

Malaysia enjoys the recognition as a major supplier in wood-based industry as well as wood panels and furniture products. Through its primary and value-added processing activities, the wood-based industry has assumed a significant role in Malaysia's industrialization programme [13]. In Industrial Master Plan (IMP), the main development objectives from that plan are to transform the wood-based industry into a major resource-based industry to maximize value-added products from forest resources as well as branding Malaysia as a reputable centre for high quality wood products such as furniture, moulding and joinery and it was already identify as a priority industry by the government as well for further development. Forest industry in Malaysia has contributed significantly towards the socio-economic development as a national renewable resource and is one of the most important sectors contributing to Malaysia's economy [7].

In 2008, the contribution of forestry and logging activities to total Gross Domestic Product (GDP) was RM 9,791,000, while the total revenue collected in forms of premium, cess and royalty was RM 351,309 in the same year [2]. In 2009, log production in Malaysia was 18.27 million m³ as the domestic market continues to be an important market for primary and secondary timber products. The construction sector served as the largest market for sawntimber followed by plywood. As of 2008, a domestic sale for sawntimber was 2,029,115 m³ and plywood 282,457 m³ [2].

In 2008, timber industry has contributed about 3.4% of forestry sector to total export and it was one of the major exchange-earners for the country. Malaysia's total export earnings for major timber products in 2008 contributed to RM 2,322,170. These amounts include the contribution from major timber products such as

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sawntimber, plywood, veneer, moulding and furniture [3]. For Sabah and Sarawak, log exporting is the primary earner for the states, however Peninsular Malaysia has not doing log exporting since 1985. In 2008, export of sawn timber amounted to RM 2.6 million as the oldest and largest wood processing industry in Malaysia and mainly producing for export market [13]. Exported of plywood amounted to RM 6.4 billion in 2008 contributing with 28% to the total timber products export earnings [8]. Among the main export destinations for timber products are United States, United Kingdom, Japan, Netherlands and China.

The forestry sector provided employment for 40,566 people in 2008 in forestry services and public sectors and private forest industries [3]. It is expected that employment opportunities in the sector will increase substantially in view of the expansion of the forest resources base through forest management and the establishment of fast growing tree plantations, as well as the modernization of forest industries to produce higher value-added products [1]. In understanding the trend that merely important to the country for revenue and formulates a policy on the forest resources, the regression analysis of the factors that influence the roundwood production should well studied.

Experimental:

The data that have been used in this study regarding for production, consumption, export and import of the roundwood in Malaysia from year 2001 till 2010 were collected from Food and Agriculture Organization (FAO) Statistics database retrieved online at www.fao.org/forestry/statistics, Forest Department Peninsular Malaysia (FDPM), Malaysia Timber Industry Board (MTIB) and International Timber Tropical Organization (ITTO). The data then analyzed using statistical software for purpose of regression analysis to determine the factors that affected the production of roundwood in Malaysia for those 10 years periods.

The factors that are being studied in this research include consumption, export and import of roundwood in Malaysia. All those factors are expected to influence the productions of roundwood in Malaysia by means of supply (production) and demand (consumption) of roundwood in Malaysia is sufficient to accommodate demand of domestic and export used. The data is then going down into excel spread sheet before to statistical software for further analysis.

RESULTS AND DISCUSSIONS

Regression result of roundwood production and consumption in Malaysia:

Regression result of roundwood production and consumption in Malaysia represented by linear equations $P = 2446.122 + 1.116 (c)$, as P is production and c is consumption. From the result, roundwood consumption is very significant with production as $B = 1.116$, $p = 0.000$ ($p \leq 0.01$). This indicates that roundwood production and consumption have a very strong positive relationship which means, every change in roundwood consumption will strongly influence roundwood production and vice versa. It shows that for every unit increase in roundwood consumption is related to influence 1.116 units increase in roundwood production. The overall model is statistically significant at $p = 0.000$ ($p \leq 0.01$) as refer to the p-value of F-Test statistic is at 307.758 and the R-squared is approximately 98% and it indicates that roundwood consumption is strongly influenced the production of roundwood.

Table 1: Linear regression for roundwood production and consumption

	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Std. Error	Beta		
(Constant)	2446.122	1291.957		1.893	.095
Consumption	1.116	.064	.987	17.543	.000

Note: $P = 2446.122 + 1.116 (c)$

P is production and, c is consumption

Regression result of roundwood production and export in Malaysia:

The regression result of roundwood production and export in Malaysia is presented by linear regression equation, $P = 13668.196 + 2.248 (e)$, as P is production and e is export. The result shows that roundwood production and export have a weak positive relationship and not significant as $B = 2.248$, $p = 0.248$ ($p > 0.05$). This means that every change in roundwood export will weakly influence roundwood production in the country. For every unit increase in roundwood export is related to influence 2.248 units increase in roundwood production. The overall model shows that is statistically not significant as $p = 0.248$ ($p > 0.05$) as refer to the p-value of F-Test statistic is at 1.552. The R-squared value is approximately only 16% which indicates that export of roundwood is weakly influenced roundwood production.

Table 2: Linear regression for roundwood production and export

	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Std. Error	Beta		
(Constant)	13668.196	9078.174		1.506	.171
Export	2.248	1.805	.403	1.246	.248

Note: $P = 13668.196 + 2.248 (e)$

P is production and,

e is export

Regression result of roundwood production and import in Malaysia:

Regression result for roundwood production with roundwood import in Malaysia is represented by the linear equation of $P = 27015.949 + (-9.386) (i)$, as P is production and i is import. The result shows that roundwood production is significant with import as $B = -9.386$, $p = 0.021$ ($p \leq 0.05$). This result indicates that roundwood production and import have a strong negative relationship, which means, in every change of roundwood import will strongly influence roundwood production in inverse relationship. It is indicating that for every unit increase in roundwood import is related to influence 9.386 units decrease in roundwood production or vice versa. The result can be interpreted as, a decrease of 9.386 units roundwood production resulted to increase a unit of roundwood import in the country. This result is somewhat expected as production is increase, import should be decrease or lower as production is sufficient to cover the demand from users/buyers. Generally, importation occurred when production could not meet the demand from users/buyers. The overall model is statistically significant at $p = 0.021$ ($p \leq 0.05$) as refer to the p-value of F-Test statistic is at 8.291. R-squared is approximately 51% of roundwood import influenced the roundwood production in the country.

Table 3: Linear regression of roundwood production and import

	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Std. Error	Beta		
(Constant)	27015.949	1046.154		25.824	.000
Import	-9.386	3.260	-.713	-2.879	.021

Note: $P = 27015.949 + (-9.386) (i)$

P is production and, i is import

From the statistic analysis, it shows that the factors that affected the production of roundwood in Malaysia are roundwood consumption and import as they are statistically strongly significant. The results are somewhat expected as roundwood production is closely related with the consumption and demand from the users. The productions of roundwood are depending on the demand from local or international consumers. The increase of roundwood production will indirectly cause the roundwood consumption to increase or vice versa as they have very strong related to each other. For the last 10 years, Malaysia has no faced any insufficient roundwood production to meet the demand of roundwood consumption as the consumption never exceeds the roundwood production.

In this study also finds that roundwood production is strongly significant with roundwood import in inverse relationship. The country has to import roundwood to about a half (50%) of the production of roundwood to meet the demand or increase the production of roundwood by 50% so that the country does not have to import the roundwood to meet the consumption in the country. Although Malaysia is one of the largest tropical roundwood exporters in the world but Malaysia still imports roundwood from other countries especially from Thailand, Myanmar, New Zealand and the United States (Seneca, 2004). Some of the volume was consumed by the domestic industry especially lumber and plywood industry which consumed 90% of total domestic roundwood consumption. Some of the volume was transhipped to log markets in Singapore, Hong Kong, China, Taiwan and Japan [11].

From the results, there is no significant between roundwood production and export. It shows that the relationship between of them is weak and it means that roundwood export not influences the production of roundwood in Malaysia. Note that, more than 90% of roundwood productions in the country have been processed domestically especially in plywood industry. Over 70% of plywood production is targeted towards the export markets. Other than that, Malaysia exports many secondary wood products such as wooden furniture, sawntimber and moulding. So, export is not the factor that influences the production of roundwood in Malaysia.

Conclusions:

As conclusion, the most influenced factors of roundwood production in Malaysia are consumption and import. But, import influenced the production of roundwood inversely. Note that if there is a little change in roundwood production in the country, it will affect the economy in wood industry sector as it has very strong

influence to each other about 98% related. As shown in the analytical result above, a little change in consumption will strongly influence the roundwood production in Malaysia.

Malaysia should focus on downstream value-added processing to remain viable as the raw materials especially roundwood is decreasing due to the depletion of our natural forests. Malaysia also nowadays focuses and committed on managing the forest in sustainable way and concerned on certification timber for exports. This research is just a preliminary and more research should be carried out especially to project the production of roundwood for another 10 to 20 years in the future to see if Malaysia still can afford to meet the demand from the users. Comprehensive research should be done to compare other factors influenced roundwood production in Malaysia with other major wood products such as plywood, moulding and sawn timber.

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