THE ROLES OF TIMBER AND NON TIMBER RESOURCES IN THE SUSTAINABLE DEVELOPMENT OF FOREST-BASED INDUSTRIES IN PENINSULAR MALAYSIA

H. Norini
Senior Research Officer
Forest Research Institute Malaysia, Kepong, 52109 Kuala Lumpur
norini@frim.gov.my

Abstract: As timber from natural forests becomes scarce, timber from forest plantations and nontimber resources, such as oil palm residues, has begun to be a potential alternative raw material for the forest-based industries (FBIs). In fact, the urge to search for alternative raw materials started to develop when P. Malaysia was forecasted to experience timber shortages of about 1.0 million m^3 in the period from 1996 to 2000 and almost 4.0 million m^3 between 2006 and 2010. Echoing the concern about future timber shortages, efforts were stepped up to promote the planting of fast-growing timber species on forest plantations. To date, 76,327 acres have been planted with various species on forest plantations in Peninsular Malaysia. Even though this figure seems reasonably substantial, because only a small staggered area is planted yearly, timber from forest plantations has not been able to cope with the ever-increasing gap created by the natural forests. Besides ensuring a sufficient supply of timber, species planted must also be those preferred by most processors. On the other hand, existing oil palm plantations are estimated to be capable of producing between 2.2 million m^3 and 9.4 million m^3 of oil palm trunks and a host of other usable oil palm residues from 2006 to 2020. Therefore, before the availability of oil palm trunks and their residues are discussed further, it is important to understand the types of species preferred by timber processors. Hence, this paper not only highlights the supply of and demand for timber, especially from plantation forests, but also discusses preferences for certain timber species and the opportunity that oil palm trunks and residues offer for continuous development of the FBIs.

Keywords: Forest-based industries, natural forest, forest plantations, oil palm residues, supply and demand.

INTRODUCTION

If one were to examine the development of the Malaysian economy, one would discover that the country's performance has hinged basically on commodity-based activities, such as agriculture, mining, and forestry and forest-based industries (FBIs). In fact, in our pursuit of industrialization, commodity-based activities still play a prominent role in the collection of the nation's foreign exchange earnings (Table 1). For instance, the export value of timber products alone ranged from a low of RM4.4 billion in 1980 to a high of RM17.1 billion in 2000 (Table1). Table 1 also indicates similar upward trends in export values for most products, except after the economic turmoil hit the region in 1997. Primary commodities that were badly hit include natural rubber and other rubber products, and palm oil and palm-oil products. As in other countries in the Asia-Pacific region, in Malaysia the economic turmoil has had a substantial impact on almost all commodities as most of Malaysia's trading partners come from the same region.

The significant contribution of timber products was part and parcel of Malaysia's transformation from a commodity-based to a manufacturing-based economy, which started to take place in 1959. The transformation of the economy itself began when the Government of Malaysia (GoM) began to place more emphasis on the expansion of the manufacturing sector. The growth in production among almost all industries was supported by the aggressive export strategy (AES) introduced under the Investment Incentives Act of 1968. Under that act, incentives such as export allowances and investment tax credits were introduced. Another important strategy, called free zones (FZs), was introduced in 1971. Following these two strategies, another incentive, called the Promotion Investment Act (PIA), was introduced in 1986. Under this act, foreign investors were allowed to have up to a 100% share of equity in any newly established company [8]. To further encourage the development of manufacturing industries in Malaysia, Industrial Master Plan 1 (IMP1) and Industrial Master Plan 2 (IMP2), covering the years between 1986 and 1995 and 1996 and 2005, respectively, were introduced.

In addition to their importance as foreign exchange earners, the FBIs are also major employment providers for the rural and suburban communities (Table 2). With a total employment of more than 196 thousand workers nationwide in 2001, the FBIs controlled about 14% of the job market in the agriculture, livestock, forestry, and fishing sectors combined, and slightly more than 2% of the country's total workforce.

To support the ever-increasing need of the growing FBIs, the GoM had no choice but to open more of the forested areas throughout the country. The need for more forested area for the development of agricultural land schemes, such as the one under the Rubber Industry Smallholder Development Authority (RISDA), the Federal Land Development Authority (FELDA), and the Federal Land Consolidation and Rehabilitation Authority (FELCRA), further aggravated the situation.

Table 1: Export value of selected items, Malaysia (RM million)

Product	1980	1990	1998	2000	2001	2002[a]
Timber products	4,365.6	8,884.1	14,203.4	17,068.5	13,873.4	8134.7
Natural rubber and other rubber products	4,618.0	3,026.6	8,567.3	7,266.1	6,353.0	3,867.9
Palm oil and palm-oil products	2,981.7	5,337.7	22,662.7	14,500.7	15,056.1	10,650.9
Crude petroleum, petroleum products, and liquefied natural gas (LNG)	6,895.9	14,434.5	17,661.6	32,776.3	32,495.6	14,481.8
Subtotal of Selected primary commodities	**18,861.2**	**31,682.9**	**63,095.0**	**71,611.6**	**67,778.1**	**37,135.3**
Electronics	n.a	n.a	81,029.5	127,856.5	109,970.3	28,085.5[b]
Electrical	n.a	n.a	16,443.8	20,591.1	18,872.9	60,584.7[b]
Total export, Malaysia	**28,171.6**	**79,646.0**	**286,561.0**	**373,307.7**	**334,420**	**200,126.3**
Percentage primary to total export	66.95	39.78	22.02	19.18	20.27	18.55

Source: Malaysia, Ministry of Primary Industries (1992 & 2002) [5, 7]
Note: n.a Denotes not available.
[a] Denotes from January to July.
[b] Denotes from January to March.

Table 2: Employment in forestry and forest-based industries, Malaysia

Region	1980	1990	1998	1999	2000	2001
P. Malaysia	73,478	75,604	49,961	87,806	86,905	45,613
Sabah	45,457	28,029	85,277	78,893	75,159	60,619
Sarawak	29,400	56,892	98,400	98,236	94,400	90,380
Total employment	148,335	160,525	233,638	264,935	256,464	196,612

Source: Malaysia, Ministry of Primary Industries (1992, 1999, 2002) [5, 6, 7]

At this juncture, understanding the development of the FBIs in relation to the timber-supply situation in the country is crucial. Therefore, this paper not only highlights the supply of and demand for timber, but also discusses timber processors' preferences for certain plantation species and the opportunity that oil-palm trunks and residues, as alternatives, offer for the continuous development of the FBIs.

Sources of Data

To assess the supply of and demand for timber, trends in the area opened for logging and planted areas under forest-plantation projects and operating capacities were used. The data used for the analyses came mainly from various publications, such as statistics on commodities published by the Ministry of Primary Industries (MPI), and partly from a series of Forestry Statistics Peninsular Malaysia published by the Forestry Department, Peninsular Malaysia.

RESULTS AND DISCUSSIONS

Insofar as the development of the FBIs is concerned, to keep the industries growing, the supply of timber came mainly from the permanent reserve forest (PRF). In this context, the supply of timber refers to volume in m^3 rather than total hectarage (Table 3). Even though, in terms of area opened for logging, the state land (SL) and alienated land (AL) seem to have the largest share, the fact that these lands usually are associated with lower volumes makes them less attractive than the PRF. In short, when the area opened for logging is discussed, more attention should be paid to the PRF than to other types of forested lands. Area opened for logging under the PRF is guided closely by the approved annual coupe decided by the National Forestry Council (NFC), chaired by the Deputy Prime Minister. To sustain the volume of timber, it is crucial that area opened for logging be in line with the area approved under the annual coupe.

Table 3: Area opened for logging, Peninsular Malaysia (1992-2002)('000 ha)

Year	Approved annual coupe	Permanent reserved forest	State land	Alienated Land	Total Area opened for logging
1992	52,250	71,027	116,095		187,122
1993	52,250	47,970	121,119		169,089
1994	52,250	51,158	109,064		160,222
1995	52,250	39,656	83,070	45,539	168,265
1996	46,040	43,707	69,211	51,327	164,245
1997	46,040	36,503	61,906	41,277	139,686
1998	46,040	51,668	41,849	21,481	114,998
1999	46,040	55,797	61,634	36,294	153,725
2000	46,040	36,867	47,193	35,804	119,864
2001	42,870	29,848	47,218	24,470	101,536
2002	42,870	31,962	43,872	29,967	105,801

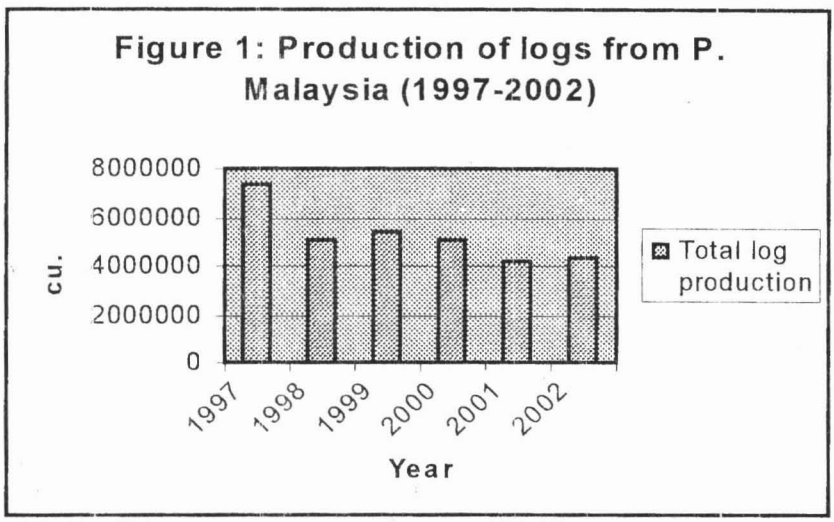
Source: Forestry Department, Peninsular Malaysia (2003) [1].

If one were to look closely at Table 3, one would realize that the area opened for logging occasionally has exceeded the annual coupe decided by the NLC, except after 2000. The issue of reducing the volume of timber from the natural forests in an effort to sustain production was raised earlier by the World Bank and later by the International Tropical Trade Organization (ITTO). According to the ITTO's recommendation, Malaysia as a nation is to produce only about 18 million m^3 a year if the production of timber from the natural forests is to be sustained. Earlier than that, like any other timber-producing country, Malaysia faced a campaign against the use of tropical timber. According to the ITTO, the campaign against the use of tropical timber started way back in 1986. Following the anti-tropical timber campaign, in 1992 the Friends of the Earth (FoE) together with other environmental non government organizations (ENGOs), such as Oxfam Netherlands and the World Wildlife Fund

Netherlands, launched what they called the Heart of the Wood campaign [3], which in this case focused on the use of certified timber.

a) Logs from the natural forests

The sudden cutback in area opened for logging affected the log-production level, not to mention the number of FBIs that have had to cease their operations either temporarily or permanently. The production of logs, which was in the region of more than 11 million m^3 in the early 1990s, reached its lowest level, 4.2 million m^3, in 2001 (Figure 1). However, log production improved slightly, to 4.4 million, in 2002.



Source: Forestry Department, Peninsular Malaysia (2003) [1]

Statistics gathered by the Ministry of Primary Industries also indicated that the numbers of both types of primary processing mills (sawmills and plywood/veneer) have experienced downward trends since the GoM decided to reduce the volume of timber extracted from the natural forests. For instance, the sawmills in Peninsular Malaysia, which numbered 711 between 1994 and 1997, declined to 667 in the year 2000 [1]. In terms of the number of sawmills actually in operation, the situation was even worse. Of the total 667 sawmills in 2000, only 499 (74.81%) were in operation. The installed capacity of the sawmills also declined, from a high of 12 million m^3 in the mid-1990s to a low of 10.7 million m^3 by 2002 [1]. These figures clearly indicate that the estimated capacity is based only on sawmills in operation. What about the sawmills that are registered but are not in operation? Are we supposed to assume that these sawmills do not have any capacity to process timber? To give a true picture of what is actually happening, it is important that all sawmills registered be accounted for. Only through such an effort can the actual situation of demand for and supply of timber be understood. If the installed capacity was based on sawmills and plywood/veneer mills in operation, i.e., 10 million m^3 and almost 1.8 million m^3, respectively, and the amount of logs available was 4.4 million m^3, the shortage then would be only about 7.4 million m^3, whereas in reality the actual shortage was 9.4 million m^3. At this juncture, the calculation of the estimated installed capacity is based entirely on primary industries, i.e., sawmills and plywood/veneer mills. The estimated installed capacity is expected to be even larger if other processing mills, such as furniture manufacturers, which sometimes are allowed to process rubberwood logs, are taken into account.

Many authors have mentioned the growing shortage of timber supply from the natural forests. Among the earliest was Thang (1985), who forecasted that by the mid-1990s Peninsular Malaysia would experience timber shortages of about 1.0 million m^3 in the period of 1996 to 2000 and almost 4.0 million m^3 between 2006 and 2010 [12]. On the other hand, Shaharuddin (1995) forecasted an even larger shortage of timber for Peninsular Malaysia, ranging from 5.29 million m^3 to 6.48 million m^3 per year between 1995 and 2000. Clearly, estimates of the growing shortage of timber by Shaharuddin (1995) were more accurate than those by Thang (1985)[12].

b) Logs from the plantation forests

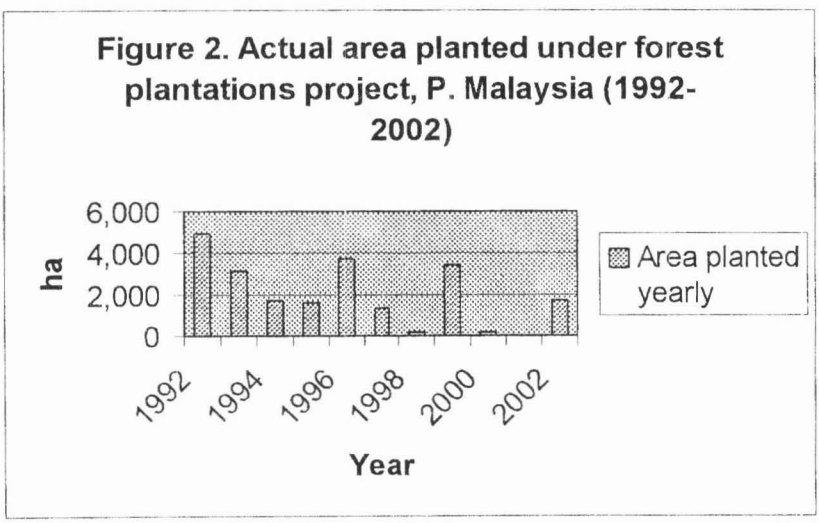
The estimated shortage of timber supply led to the development of forest-plantation projects throughout the country. Table 4 indicates the areas under forest plantations before the 1990s until the year 2002.

Table 4: Existing areas of forest-plantation projects, Peninsular Malaysia (in ha)

Year	CFPP	State Projects	Teak	Pine	Hevea	Acacia mangium	Others	Total
< 1990	39,266	3,728	1,084	4,446	30	240		48,794
1991	44,507	3,728	1,384	4,446	30	240		54,335
1992	49,388	3,728	1,479	4,446	30	240		59,311
1993	52,370	3,728	1,628	4,446	30	252		62,454
1994	53,535	3,728	1,798	4,446	392	252		64,151
1995	54,499	3,728	2,028	4,446	608	472		65,781
1996	57,346	3,728	2,363	4,446	908	657		69,448
1997	57,980	3,728	2,363	4,446	1,419	859		70,795
1998	57,980	3,728	2,363	4,446	1,419	1,041		70,977
1999	56,593	6,272	2,433	3,561	1,674	1,765	2,137	74,435
2000	57,439	5,518	2,433	3,555	1,258	2,235	2,162	74,600
2001	57,484	5,518	2,433	3,555	1,258	2,235	2,162	74,600
2002	57,591	5,451	2,871	4,093	1,870	1,582	2,869	76,327

Source: Forestry Department, Peninsular Malaysia (2003) [1]

To date, the total area planted, 76,327 ha, indicates that the forest-plantation project is far below the original target of 188 thousand hectares [2]. According to Hashim, the compensatory forest-plantation project (CFPP), which was launched in 1982, has a target of establishing approximately 188 thousand hectares of forest plantations within 15 years [2]. Stated differently, not only is the total area planted less than expected, but also the staggered area planted yearly is too small to alleviate the existing timber shortage. For example, the largest and smallest areas ever recorded were almost 5,000 ha in 1992 and 165 ha in 2000, respectively (Figure 2).



Source: Forestry Department, Peninsular Malaysia (2003) [1]

Such inconsistent planting activities each year make future planning for production and expansion of industrial capacity difficult for most FBIs to handle. The situation seems even worse if one were to estimate the future of timber supply from these forest plantations. For instance, based on the area planted in 1992, 4,881 ha, and volume of 160 m^3 per ha, a 15-year rotation of *Acacia mangium* is

expected to be able to generate almost 781 thousand m^3 in 2007. Nonetheless, as the area planted yearly was scaled down, the expected volume from *Acacia mangium* plantation also started to decrease.

Table 5 shows the status of logs extracted from forest plantations currently planted in Peninsular Malaysia. Clearly, the volume of timber extracted from individual states is not only sometimes small but also irregular in most years. Of the total 13,895 m^3 extracted from forest plantations, 11,252 m^3 came from jati, whereas another 1,568 m^3 and 757 m^3 came from *Acacia mangium* and batai, respectively. The remaining 318 m^3 came from other species, which are too minor to be discussed in this paper. Therefore, when one refers to the aforementioned timber shortage of 4.4 million m^3 in 2002, it is obvious that the production from various forest plantations has no way whatsoever of fulfilling the demand.

Table 5: Production of logs from forest plantations, by state, Peninsular Malaysia (m^3)

State	1997	1998	1999	2000	2001*	2002
Johore	11,909	12,449				62
Kedah						176
Kelantan						837
Malacca						
N.Sembilan						
Pahang	15,776	14,107				12,806*
Perak						
Perlis						
Penang						
Selangor	7,345					
Terengganu						14
Federal Territory						
Total	35,030	26,556				13,895

Source: Forestry Department, Peninsular Malaysia (2003) [1]
Note: Blank space indicates no data entry.
* Denotes not available

One of the ways to overcome the shortage of logs is to resort to importation. For the past nine years, Peninsular Malaysia has imported between 155 thousand m^3 and 736 thousand m^3 of logs, worth RM 38 million and RM 211 million, accordingly (Forestry Department, Peninsular Malaysia, 2003 [1]). With such a small import volume, to derive raw material from overseas surely is not an attractive option. As a result, sawmills and plywood/veneer mills have had no choice but to curtail their operations, sometimes permanently. The small amount of importation also indicates that the best possible option for tackling the timber-shortage problem is to plant more trees. To date, forest plantation seems to be the best option because it provides more volume in the shortest time possible.

Unfortunately, not many planters understand the timber processors' demand for the so-called "preferred species." Yet species to be planted should be closely related to the demand of timber processors, to ensure not only that a market does exist, but also that the right prices can be obtained for the final products. In view of this, the Japan International Cooperation Agency (JICA) has commissioned the Forest Research Institute Malaysia (FRIM) to look into the potential of the fast-growing species planted in Perak. The project was a collaborative effort together with the Department of Forestry, Peninsular Malaysia, and the State Forestry Department of Perak, with two main objectives, i.e., testing silviculture regimes and serving as species trial plots. Analyses carried out based on responses to a structured questionnaire indicated that if 50% is the cut-off point for the ranking of highly-sought-after species, only 21 of the 49 species planted have market potential [9]. Another important observation worth highlighting here is that species preferred by sawmills, plywood/veneer mills, and moulding and furniture manufacturers are those well known to the processors, such as from the meranti, keruing, kempas, and other groups (Table 6).

Table 6: The 21 highly-sought-after species

No.	Vernacular Name	Respondents' ranking of species (%)
1	Meranti temak nipis	71.4
2	Meranti tembaga	69.1
3	Nyatoh taban merah	66.7
4	Kempas	61.9
5	Bintangor	61.9
6	Mengkulang jari	59.5
7	Meranti kepong	59.5
8	Mempisang	59.5
9	Jelutong	59.5
10	Balau laut	57.1
11	Keruing kertas	57.1
12	Keruing neram	57.1
13	Meranti bukit	57.1
14	Jati	54.8
15	Meranti melantai	54.8
16	Meranti sarang punai	54.8
17	Balau pasir	52.4
18	Keruing bulu	52.4
19	Kapur	52.4
20	Kembang semangkok bulat	52.4
21	Kembang semangkok jantong	50.0

Source: Norini, et al. (2002).

b) Raw material from oil-palm plantation

Another prominent source of alternative raw material for timber processors is oil-palm residues. Based on the oil-palm-planted area by age group, the average density of 134 palms, and a volume of 1.638 m^3 per trunk (Khali Aziz & Wan Razali 1991[4]) ha^{-1}, Norini, Mohd Azmi, and Wan Asma (2002) projected that the availability of oil-palm trunks in Malaysia ranged from a low of 878 thousand m^3 to a high of 14.05 million m^3 between 2004 and 2020 [10]. Norini, Mohd Azmi, and Wan Asma (2000) also estimated that in the 9th Malaysia Plan, the volume of trunks/stems in the Peninsula alone, was in the region of 28.5 million m3, whereas fronds at pruning and replanting individually may reached to158 million tonnes and 114 million tonnes, respectively (Table 7) [10]. Besides oil-palm trunks, other oil-palm residues, such as empty fruit branches (EFB) and mesocarp fibre, were also found in substantial quantities.

Research and development (R & D) conducted by many research institutions has indicated the utility of oil-palm stem as a substitute raw material in the production of panel products such as medium-density fibreboard (MDF), particleboard, mineral-bonded particleboard, blockboard, fibre cementboard, and pulp and paper, as well as animal feed. Today, several industries have taken a major step in switching from timber to nontimber as raw material in an effort to sustain their production. In light of the timber shortage faced by the FBIs, every effort must be made to use the available resources, be they timber or nontimber. Readers interested in detailed figures on the availability of oil-palm trunks, EFB, and other residues related to oil palm are advised to refer to the original report.

Table 7: Projection on the availability of oil palm trunks/stems and fronds, Peninsular Malaysia

Malaysia Plan	No. of trunks/stems ('000)	Volume of oil palm trunks/stems ('000) m3	Fronds at prunning tonnes ('000)	Fronds at replanting tonnes ('000)
9th Plan (2006-2010)	17420	28534	158461	113891
10th Plan (2006-2010)	26264	43020	157405	113131
11th Plan (2006-2010)	17688	28973	441987	114558

Source: Norini, et al. (2000)

CONCLUSIONS

Quick analyses of the supply of and demand for timber indicated that the shortage experienced by the FBIs is there to stay. With the increasing trend of less timber being available from the natural forests, forest plantations and other nontimber resources are expected to play a much greater role in the future.

It cannot be denied that Peninsular Malaysia has been involved in the development of forest plantations for the past 15 years. However, the total area engaged in forest plantation yearly is too small to support timber processors' ever-increasing hunger for timber. To put it differently, efforts need to be stepped up to encourage the development of forest plantations in this country. Before this can be done, all of the fundamental constraints, such as the fiscal incentives for forest-plantation development, must be constantly reviewed. As consumers' preferences change, fiscal incentives also must be changed to ensure that some, if not all, of the needs of planters are fulfilled.

The substantial amount of oil-palm residue available during processing and replanting is another nontimber resource that needs special attention in terms of promotion. The small number of takers so far might indicate that few are knowledgeable about the usefulness of oil-palm residues or that the manufacturers themselves are not willing to commit to using the new raw material. In this case, FRIM and the Malaysian Timber Industry Board (MTIB) could help promote the use of oil-palm residues as alternative resources for timber by working together more closely.

Besides the timber-shortage problem, the FBIs also are faced with other challenges, such as the anti-tropical-timber campaign, timber certification, and other uncertainties in the trade environment. Therefore, helping the FBIs handle the timber-supply issue would certainly aid the industries in improving competitiveness, not to mention saving money in terms of production.

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