

FOREST MANAGEMENT CERTIFICATION GROWTH IN MALAYSIA: THE CASE OF THE MALAYSIAN TIMBER CERTIFICATION SCHEME

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Abstract: The Malaysian Timber Certification Scheme's (MTCS) forest management certifications, which consist of natural forest certification and plantation forest certification, were introduced in 2001 and 2014, respectively. Since it has been two decades since MTCS's forest management certifications were adopted and practised, a study was conducted to analyse the growth of MTCS's natural forest certification between 2002 and 2021, MTCS's plantation forest certification between 2014 and 2021, and the contributing factors. The data obtained from the Malaysian Timber Certification Council's annual reports between 2002 and 2021 were analysed using descriptive analysis. The Compound Annual Growth Rate (CAGR) and Average Annual Growth Rate (AAGR) of the MTCS-certified natural forest area were 4% and 1.3% respectively. For the MTCS-certified plantation forest area, the CAGR and AAGR were 36% and 39%, respectively. Several factors have contributed to the growth of forest management certifications in Malaysia, such as the Malaysian Timber Certification Council's (MTCC) phased or step-wise approach, the Sarawak state government's forest policy reform, the endorsement of MTCS by the Programme for the Endorsement of Forest Certification (PEFC), and the implementation of global timber legality legislations, among others. While it is evident that there is significant growth in the MTCS-certified forest areas and certificate holders between 2002 and 2021, it is important to maintain and expand this certification.

Key words: Certification growth, forest management certification, Malaysian Timber Certification Scheme, natural forest certification, plantation forest certification.

INTRODUCTION

Forest management certification is an important part of forest certification to demonstrate that a forest is sustainably and legally managed in accordance and compliance with specified standards (Cashore et al. 2004, Busch & Ferretti-Gallon 2017). Forest management certification validates forest management activities against the standards for sustainable forest management (Cashore et al. 2004). Malaysia has adopted and practised forest certification since the end of the 1990s with the aim of ensuring that forest and forest-based industries in Malaysia are managed in a

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sustainable and legal manner according to the defined environmental, social, and economic principles (Murughan et al. 2023). Saadun et al. (2019) stated that forest and forest-based sectors contributed significantly to the nation's socioeconomics, and thus, forest certification will remain an important part of these sectors. The Malaysian Timber Certification Scheme (MTCS), which was developed in 2001, is the largest certification provider in Malaysia, with a total of 5.35 million hectares of certified forest that includes both natural and plantation forests in 2021 (MTCC 2021, Murughan et al. 2023). The MTCS standards, which include the Malaysian Criteria and Indicators for Sustainable Forest Management (for natural forest) and Forest Plantation Version 2 (for forest plantation), were developed to assess both natural and plantation forest management units for the purpose of this certification, respectively (MTCC 2023). The development of these standards was facilitated by the Malaysian Timber Certification Council (MTCC) as the governing body for the MTCS standards (MTCC 2023). MTCS was endorsed by the Programme for the Endorsement of Forest Certification (PEFC), which is the largest forest certification provider in the world (MTCC 2023). This endorsement has enabled MTCS to be accepted by other PEFC-endorsed schemes globally, as well as in the developed nation's national timber procurement policies (MTCC 2023). To date, a total of 280 million hectares of forest area have been certified globally, including North America (55%), Europe (28%), Oceania (7%), Asia (6%) and South America (3%), under the PEFC certification scheme (PEFC 2023). Malaysia is one of the top ten countries with the largest certified forest area under PEFC in 2022 (PEFC 2023).

The MTCS's forest management certification for the natural forest was introduced in 2001, while that for the plantation forest was introduced in 2014 (MTCC 2001, MTCC 2014). In 2021, there were 5.2 million hectares of MTCS-certified natural forest area: Peninsular Malaysia (thereafter Peninsular) was 4.05 million hectares, Sarawak was 1.0 million hectares, and Sabah was 0.15 million hectares (MTCC 2021). The first MTCS-certified natural forest was in Peninsular (Pahang FMU, Terengganu FMU, and Selangor FMU) in 2001, with a total area of 2.3 million hectares (MTCC 2001). The first MTCS-certified natural forest in Sarawak (Sela'an-Linau FMU) and Sabah (Segaliud-Lokan FMU) was in 2004 with 0.06 million hectares and in 2009 with 0.06 million hectares, respectively (MTCC 2004, MTCC 2009). The MTCS-certified natural forest areas then increased significantly from 2.3 million hectares in 2001 to 5.2 million hectares in 2021, recording an increase of 56% (MTCC 2001, MTCC 2021). Likewise, the number of MTCS-certified natural forest certificate holders has increased significantly from 3 in 2001 to 21 in 2021, recording an increase of 86% (MTCC 2001, MTCC 2021). In 2021, there were 0.139 million hectares of MTCS-certified plantation forest area: Sarawak had 0.095 million hectares, and Sabah had 0.044 million hectares (MTCC 2021). There was no MTCS-certified plantation forest area in the Peninsular (MTCC 2021). The first MTCS-certified plantation forest was in Sarawak (Kuala Baram FPMU and Segan FPMU) in 2014, with a total area of 0.012 million hectares, followed by Sabah (Bornion Timber FPMU) in 2016 with a total area of 0.026 million hectares (MTCC 2014, MTCC 2016). The MTCS-certified plantation forest areas then increased from 0.012 million hectares in 2014 to 0.14 million hectares in 2021, recording an increase of 91% (MTCC 2014, MTCC 2021). Similarly, the number of MTCS-certified natural forest

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certificate holders increased from 2 in 2014 to 9 in 2021, recording an increase of 78% (MTCC 2014, MTCC 2021).

Several studies conducted on the growth of forest certification globally have reported positive growth in terms of certification area over the years. Fernholz et al. (2021) reported that the Forest Stewardship Council (FSC) and PEFC-certified forests have grown steadily between 2004 and 2020. The certified forest area for both FSC and PEFC was 51 million hectares and 53 million hectares, respectively, in 2004, and has increased to 222 million hectares and 320 million hectares in 2020, respectively (Fernholz et al. 2021). This shows an increase of 77% and 83%, respectively. Similarly, another certification provider, the United States-based Sustainable Forest Initiative (SFI), has increased from 37 million hectares in 2004 to 152 million hectares in 2020 (Fernholz et al. 2021). This shows an increase of 76%. Iwanaga et al. (2019) reported that the growth rate of FSC-certified forest areas in Southeast Asia between 2012 and 2017 was 211%, with Malaysia (148%), Indonesia (238%), Thailand (274%), and Vietnam (554%) having the highest rate. This explains that the certified forest area has been increasing positively globally. Accordingly, in the case of Malaysia, it is important to study the growth of forest certification, particularly the MTCS. While it is evident that there is an increase of MTCS-certified forest areas for both natural and plantation forests between 2002 and 2021 and between 2014 and 2021, respectively, it is important to study the growth and trend of these certified forests by the overall 20 years, by each decennial and by each quinquennial for the duration of 2002-2021 and 2014-2021, respectively. Similarly, Murughan et al. (2023) have reported that studies on the growth of forest certification of both forest management certification and chain of custody certification in Malaysia are vital to be explored. Thus, this study aimed to examine the growth of MTCS's forest management certification and the contributing factors.

METHODOLOGY

This study employed secondary data which were obtained from the MTCC's Annual Reports between 2002 and 2021. The data included both MTCS-certified natural forest areas and MTCS-certified plantation forest areas, as well as the MTCS certificate holders between 2002 and 2021 and between 2014 and 2021, respectively. The data were used to determine the Annual Growth Rate (AGR), Compound Annual Growth Rate (CAGR), and Average Annual Growth Rate (AAGR). Saadun et al. (2019) have used a similar method to analyse the trend and growth of MTCS-certified timber products between 2003 and 2015. For the MTCS-certified natural forests area and certificate holders' data, the AGR, CAGR, and AAGR were performed for overall 20 years between 2002 and 2021, by decennial from 2002-2011, and 2012-2021, and by quinquennial from 2002-2006, 2007-2011, 2012-2016, and 2017-2021. Meanwhile, for MTCS-certified plantation forest areas and certificate holders' data, the AGR, CAGR, and AAGR were performed for the overall eight years between 2014 and 2021. The AGR, CAGR, and AAGR were calculated using Equation 1, Equation 2, Equation 3, Equation 4, and Equation 5 (Saadun et al. 2019).

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Equation 1

AGR of the MTCS-certified natural forest area/ plantation forest area/ certificate holders was calculated using Equation 1:

$$AGR_t = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$$

Where

- AGR_t = annual growth rate at year t
- Y_t = total MTCS-certified natural forest area/ plantation forest area/ certificate holders at year t
- Y_{t-1} = total MTCS-certified natural forest area/ plantation forest area/ certificate holders at year t-1

Equation 2

CAGR of MTCS-certified natural forest area/ plantation forest area/ certificate holders was calculated using Equation 2:

$$CAGR(t_0, t_n) = \left(\frac{Y(t_n)}{Y(t_0)} \right)^{\frac{1}{t_n - t_0}} - 1$$

Where

- CAGR(*t*₀, *t*_{*n*}) = compound annual growth rate between year *t*₀ and *t*_{*n*}
- t*₀ = initial year of calculation
- t*_{*n*} = final year of calculation
- t*_{*n*} - *t*₀ = n (total years calculation)
- Y(*t*₀) = total MTCS-certified natural forest area/ plantation forest area/ certificate holders at year *t*₀
- Y(*t*_{*n*}) = total MTCS-certified natural forest area/ plantation forest area/ certificate holders at year *t*_{*n*}

Equation 3

The log-linear regression was employed to estimate the AAGR of total MTCS-certified natural forest area/ plantation forest area/ certificate holders by using Equation 3:

$$\ln \ln (Y_t) = \alpha + \beta^t + \varepsilon^t$$

Where

- Y_{*t*} = natural log of total MTCS-certified natural forest area/ plantation forest area/ certificate holders at year t
- α and β = unknown parameters
- ε = error term with mean = 0 , common variance; ε_{*t*} ~ N(0, σ²)

Equation 4

α and β were estimated using the least squares method, and the estimated model is as shown in Equation 4:

$$\ln \ln (Y_t) = \alpha + \beta^t$$

Equation 5

The estimated time variable becomes the total MTCS-certified natural forest area/ plantation forest area/ certificate holders AAGR. The percentage of AAGR was calculated using Equation 5:

$$AAGR = \beta \times 100$$

RESULTS AND DISCUSSION

MTCS-Certified Natural Forest

The MTCS-certified natural forest area showed a slight fluctuating upward trend between 2002 and 2021 (Figure 1). In 2002, there were about 2 million hectares of MTCS-certified natural forest area, which has increased to about 5 million hectares within the next two decades in 2021 (Table 1). The CAGR and AAGR were estimated at 4% and 1.3%, respectively (Table 1). The first decennial recorded the highest CAGR and AAGR of 7% and 4.1%, compared to the second decennial, which recorded CAGR and AAGR of 2% and 1%, respectively (Table 2). In terms of the quinquennial period, the first and fourth quinquennial periods recorded the highest CAGR and AAGR of 15% and 15.7%, and 6% and 7.6%, compared to the second and third quinquennial periods with the CAGR and AAGR of 4% and 4.7%, and -3% and -3%, respectively (Table 2). For the MTCS-certified natural forest certificate holders, the CAGR and AAGR were estimated at 11% and 5.9%, respectively (Table 2).

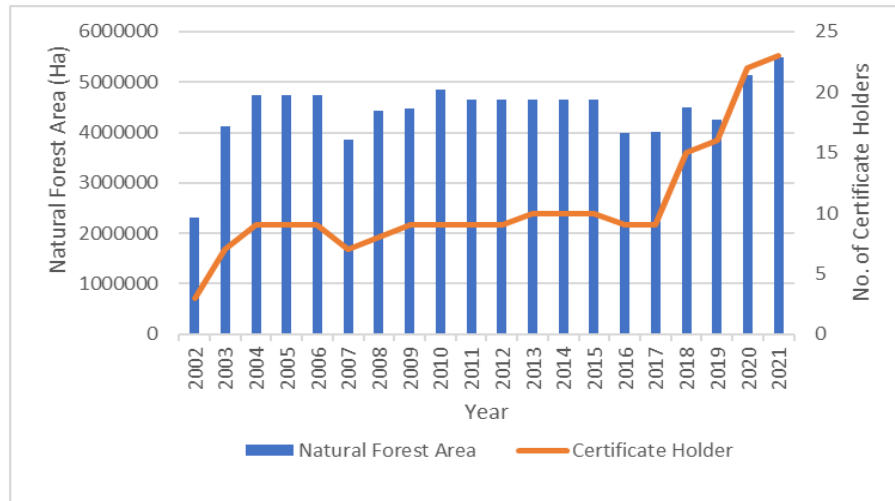


Figure 1. MTCS-Certified Natural Forest Area and Certificate Holders (2002-2021).

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The second decennial recorded the highest CAGR and AAGR of 10% and 10.6%, compared to the first decennial, which recorded CAGR and AAGR of 12% and 6.7%, respectively (Table 2). This was contrary to the same corresponding period of the MTCS-certified natural forest area. Similar to the MTCS-certified natural forest area, the first and fourth quinquennial periods recorded the highest CAGR and AAGR of 25% and 24.5%, and 21% and 22.6%, respectively (Table 2). Generally, the first decennial (2002-2011), and in particular, the first quinquennial (2002-2006) and fourth quinquennial (2016-2021) periods have contributed to the high increase in the MTCS-certified natural forest area and certificate holders.

Table 1. Estimated AGR, CAGR, and AAGR of MTCS-Certified Natural Forest Area and Certificate Holders (2002-2021).

Year	MTCS-Certified Natural Forest Area (Ha)	Annual Growth Rate (AGR)	Certificate Holder	Annual Growth Rate (AGR)
2002	2310567	-	3	-
2003	4111406	78%	7	133%
2004	4730774	15%	9	29%
2005	4730774	0%	9	0%
2006	4730774	0%	9	0%
2007	3850217	-19%	7	-22%
2008	4426152	15%	8	14%
2009	4477433	1%	9	13%
2010	4856801	8%	9	0%
2011	4646068	-4%	9	0%
2012	4646460	0%	9	0%
2013	4649913	0%	10	11%
2014	4649913	0%	10	0%
2015	4651161	0%	10	0%
2016	3995683	-14%	9	-10%
2017	4018219	1%	9	0%
2018	4491270	12%	15	67%
2019	4255650	-5%	16	7%
2020	5139745	21%	22	38%
2021	5480914	7%	23	5%
CAGR		4%		11%
	R ²	0.19	R ²	0.648
AAGR	Coefficient (β)	0.013 (0.006)	Coefficient (β)	0.059* (0.010)
	% growth	1.3%	% growth	5.9%

Note: Figure in parenthesis indicates the standard error of the respective coefficient

*- Significant at 0.05 level

Table 2. Estimated AGR, CAGR, and AAGR of MTCS-Certified Natural Forest Area and Certificate Holders by Decennial and Quinquennial.

Year / Details		Decennial			Quinquennial		
		2002-2011	2012-2021	2002-2006	2007-2011	2012-2016	2017-2021
Area	Mean	4287097	4597893	4122859	4451334	4518626	4677160
	CAGR	7%	2%	15%	4%	-3%	6%
	R²	0.310	0.090	0.641	0.720	0.495	0.847
	AAGR	4.1%	1.0%	15.7%	4.7%	-3.0%	7.6%
Certificate Holders	Mean	8	13	7	8	10	17
	CAGR	12%	10%	25%	5%	0%	21%
	R²	0.351	0.740	0.662	0.773	0	0.899
	AAGR	6.7%	10.6%	24.5%	6.2%	0%	22.6%

MTCS-Certified Plantation Forest

The MTCS-certified plantation forest area between 2014 and 2021 experienced an upward trend (Figure 2). The CAGR and AAGR were estimated at 36% and 39%, respectively (Table 3). Likewise, the MTCS-certified plantation forest certificate holders between 2014 and 2021 experienced an upward trend (Figure 2). However, the number of certificate holders declined in 2018 and increased from 2019 to 2021 (Figure 2). The CAGR and AAGR were estimated at 21% and 22.6%, respectively (Table 3). As a result, there was a high increase in the MTCS-certified plantation forest area and certificate holders between 2016 and 2021. This was similar to the case of MTCS-certified natural forest areas and certificate holders.

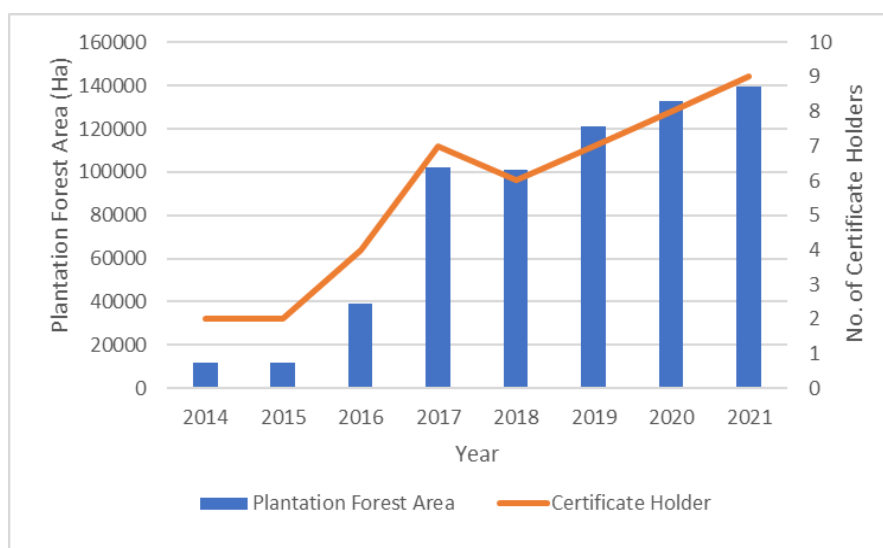


Figure 2. MTCS-certified plantation forest area and certificate holders (2014-2021).

Table 3. Estimated annual growth, CAGR, and AAGR of MTCS-certified plantation forest area and certificate holders (2014-2021).

Year	MTCS-Certified Plantation Forest Area (Ha)	Annual Growth Rate (AGR)	Certificate Holder	Annual Growth Rate (AGR)
2014	11807	-	2	-
2015	11807	0%	2	0%
2016	39014	230%	4	100%
2017	101921	161%	7	75%
2018	101030	-1%	6	-14%
2019	120971	20%	7	17%
2020	132989	10%	8	14%
2021	139465	110%	9	13%
CAGR		36%		21%
	R ²	0.815	R ²	0.840
AAGR	Coefficient	0.390*	Coefficient	0.226*
	(β)	(0.076)	(β)	(0.040)
	% growth	39%	% growth	22.6%

Note: Figure in parenthesis indicates standard error of the respective coefficient

*- Significance level at 0.05

There were several factors that might have contributed to the increase in the MTCS-certified forest management certification growth since 2002. Generally, the forest certification progress has been relatively slow in the timber and timber-products producer countries since the 1990s (Simula et al. 2003, Nussbaum & Simula 2013). While there are many factors causing the slow progress of forest certification growth in these countries, compliance with forest certification standards remains one of the main factors (Nussbaum & Simula 2013). Accordingly, the International Tropical Timber Organization (ITTO), an international organisation that promotes the sustainable management of tropical forests and the trade of sustainable and legal tropical timber and timber products, has advocated the concept of a phased or step-wise approach to adopt forest certification (Simula et al. 2003, Durst et al. 2006). The phased or step-wise approach is an approach where forest certification can be attained in stages (Durst et al. 2006, Nussbaum & Simula 2013). Accordingly, in Malaysia, the MTCC introduced the phased or step-wise approach in 2002 to adopt MTCS's forest management certification in stages (MTCC 2002, Chew et al. 2009, Nussbaum & Simula 2013, Chew 2019). The phased or step-wise approach requires the forest management units to undertake the MTCS's forest management certification and to comply with a smaller set of MTCS's Malaysian Criteria, Indicators, Activities, and Standards of Performance for Forest Management Certification or MC&I 2001, which was developed based on the 1998 ITTO Criteria and Indicators for Sustainable Management of Natural Tropical Forests that includes 29 indicators (MTCC 2002, Chew et al. 2009, Chew 2019, Yong & Siti 2022). The MC&I 2001 has then been

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updated to MC&I 2002, which includes 47 indicators in 2005 (MTCC 2005, Chew et al. 2009, Chew 2019, Yong & Siti 2022). This approach has enabled the forest management unit managers to develop management procedures, documentation, and human capital to manage their natural forests in a sustainable manner; and to adopt the MC&I 2002, which is a more complex standard than the MC&I 2001 (MTCC 2005, Chew et al. 2009, Yong & Siti 2022, Chew 2019). As a result, a significant rise in MTCS-certified natural forest areas was recorded between 2002 and 2006. For instance, the MTCS-certified natural forest area doubled from 2.31 million hectares in 2002 to 4.67 million hectares in 2006 (MTCC 2002, MTCC 2006). Similarly, the number of MTCS-certified natural forest certificate holders has doubled from 3 to 8 (MTCC 2002, MTCC 2006).

The government's forest-related policy reform has played a significant role in the growth of forest management certification. Nussbaum & Simula (2013) stated that the government could achieve forest management certification by mandating this voluntary forest management certification standard and incorporating this standard in their forest-related laws and regulations. In this case, for instance, in Sarawak, initially, the State Government of Sarawak mandated the forest certification for long-term forest timber license holders which operates in the Heart of Borneo (HoB) areas to obtain forest management certification in 2014 (FDS 2023a, FDS 2023b). The HoB is a government-led and international initiative to conserve and manage forests in a sustainable manner in Malaysia (Sabah and Sarawak), Brunei Darussalam, and Indonesia (Kalimantan) (FDS 2023b). Accordingly, in 2018, the Sarawak state government introduced mandatory forest management certification to all long-term forest timber license holders, with long-term forest timber licence holders in Sarawak to obtain forest management certification by 2022 (Semilan et al. 2022, FDS 2023b). This is also in line with the state forest policy to reform the state's sustainable forest management (Semilan et al. 2022, FDS 2023a). As a result, in Sarawak, a significant rise in both the MTCS-certified natural forest and MTCS-certified plantation forest areas was recorded between 2017 and 2021 and between 2015-2021, respectively (MTCC 2015, MTCC 2016, MTCC 2017, MTCC 2018, MTCC 2019, MTCC 2020, MTCC 2021).

The recognition and acceptance of MTCS by the PEFC, which is the largest certification provider globally, may contribute to the growth of these forest management certifications. Similarly, Nussbaum & Simula (2013) stated that the national forest certification programs considered that mutual recognition and endorsement by the PEFC would enable the promotion and acceptance of their programs at the global level. The MTCS, which was initially endorsed by the PEFC in May 2009, was re-endorsed in July 2014 and in June 2021 accordingly (MTCC 2009, Chew et al. 2009, MTCC 2014, Chew 2019, MTCC 2021). There was a slight increase in the MTCS-certified natural forest areas and certificate holders in the second quinquennial (2007-2011) since the initial endorsement in 2009. Likewise, there was a slight increase in the MTCS-certified natural forest areas and certificate holders in the fourth quinquennial (2017-2021) and a significant increase in the MTCS-certified plantation forest areas and certificate holders between 2014 and 2021 since the re-endorsement in 2014 and 2021.

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Since the beginning of the 2010s, the major timber and timber-products consumer countries, such as Australia, the European Union, the Republic of Korea, Japan, and the United States, among others, have prohibited the trade of illegally produced timber and timber products into their markets. For instance, Australia introduced the Australian Illegal Logging Prohibition Act in 2012, the European Union introduced the European Union Timber Regulation in 2013, Japan introduced the Clean Wood Act in 2016, the Republic of Korea introduced the Act on the Sustainable Use of Timbers in 2018 and the United States introduced Lacey Act 1900 (Amendment of 2008) in 2008, respectively (Leipold et al. 2016, KFS 2023, MAFF 2023, EC 2023, USC 2023, DAWRA 2023). These timber legality legislations have established stringent penalties for the violation of the act, which include fines, imprisonment, and forfeiture of the products, among others (Leipold et al. 2016, KFS 2023, MAFF 2023, EC 2023, USC 2023, DAWRA 2023). Malaysia is one of the major timber and timber-products producing and exporting countries that have to comply with these timber legality legislations. While forest certification does not provide the green lane in these timber legality legislations, it does provide due diligence. Similarly, Nussbaum & Simula (2013) echoed that while there was no general system available to prove the legal compliance of timber and timber products, forest certification incorporated legal compliance in its standard. Thus, the MTCS and PEFC forest certification standards meet the needs of these timber legality legislation (MTCC 2023, PEFC 2023). Since these timber legality legislations were enforced between 2012 and 2018, both the MTCS-certified natural forests and plantation forests increased significantly, particularly since 2015.

CONCLUSION

The MTCS forest management certifications consist of both natural and plantation forest certifications. The first MTCS-certified natural forest was in the Peninsular in 2001, followed by Sarawak in 2004 and Sabah in 2009. Meanwhile, the first MTCS-certified plantation forest was in Sarawak in 2014, followed by Sabah in 2017. There was no MTCS-certified plantation forest area in the Peninsular. For the period of 2002 and 2021, the CAGR and AAGR of the MTCS-certified natural forest area were 4% and 1.3%, respectively. For the period of 2014 and 2022, the CAGR and AAGR of the MTCS-certified plantation forest area were 36% and 39%, respectively. Both MTCS-certified natural forest and plantation forest areas and certificate holders showed a relatively upward trend between 2001 and 2021 and between 2014 and 2021, respectively. The first decennial (2002-2011), and in particular, the first quinquennial (2002-2006) and fourth quinquennial (2016-2021) periods have contributed to the high increase in the MTCS-certified natural forest area and certificate holders. There was also a high increase in the MTCS-certified plantation forest area and certificate holders between 2016 and 2021. Several factors, such as the MTCC's phased or step-wise approach introduced in 2001; Sarawak's state government's forest policy reform to mandate forest management certification to all long-term forest timber license holders by 2022; the recognition, acceptance, and endorsement of MTCS by the PEFC in 2009, 2014 and 2021; and the implementation of global timber legality legislations have significantly contributed to the growth of the MTCS's forest management certifications in Malaysia. As both the MTCS-certified natural forest and plantation

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forest are very important to the Malaysian forest and forest-based sector, maintaining and expanding the MTCS's forest management certification is crucial. A similar study should be conducted to explore the MTCS's chain of custody certification growth and the contributing factors. As the chain of custody certification is an integral part of forest certification, this research will provide a comprehensive context of MTCS's forest certification growth in Malaysia.

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