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Forest carbon market in Vietnam

Legal framework, opportunities and challenges

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CIFOR

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View of the Vietnam landscape
Photo by Terry Sunderland/CIFOR

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Executive summary

This report aims to identify forest carbon potential, review relevant policies, and explore opportunities and challenges for Vietnam to develop and operate a forest carbon market. The report also provides recommendations for Vietnam and other stakeholders on developing effective, efficient and equitable forest carbon policies and projects.

With 42% forest cover (MARD 2022a), Vietnam has enormous potential for developing forest carbon credit projects. In 2021, the country had approximately 612 million metric tons of carbon stored in its forests, 80% of which was in natural forests. During the 2010–2020 period, most forestry sector emissions were the result of natural forest degradation and loss, and conversion of natural forest to plantation forests. Meanwhile, carbon sequestration during the same period was mainly due to restoration of natural forests and afforestation, including new afforestation and reforestation.

The Central Highlands Region currently has the highest forest carbon stock, while the Northeast, North Central and Central Coast regions also have significant potential for benefitting from forest carbon market development. Most areas with potential for afforestation and reforestation carbon projects are in the north of the country, with only a few in the south. Studies by numerous Vietnamese scientists have looked at forest carbon stock measurements in different forest types and localities in the north and south over the past two decades. These studies all indicate forest carbon stock increasing gradually as forests age, while some show mixed-species plantation forests having higher carbon stock than monoculture plantations. This indicates that policies promoting a forest carbon market should be geared towards protecting existing forest areas rather than focusing solely on afforestation and reforestation. Meanwhile, strict regulations are needed to improve biodiversity and forest quality when encouraging restoration and large, long-term timber plantations, as are financial incentives and mechanisms to mitigate investment risks.

Aware of the important roles the forestry sector play in emissions reduction and climate change mitigation and adaptation, since 2015 the government has introduced a series of new policies to create a favourable legal framework for developing a forest carbon market. It has also focused on raising stakeholder awareness and interest in investing in the forestry sector. Having strong political commitment at both national and subnational levels, increasing numbers of buyers looking to purchase forest carbon credits, stable political institutions, and technical and financial support for forestry and emissions reduction from donors and international organizations, Vietnam has many favourable conditions to develop and benefit from domestic and global forest carbon markets. In addition, as the first and only country in Asia with a national policy on Payments for Forest Environmental Services (PFES), Vietnam has gleaned rich experience implementing results-based payment schemes since the PFES pilot programme in 2002 and implementation in 2008. With pilot forest carbon payment projects, such as the recently approved Emissions Reduction Payment Agreement (ERPA) for the North Central Region, Vietnam will continue finalizing policies to connect domestic and international forest carbon markets.

Despite enabling conditions for developing a forest carbon market being in place, Vietnam still faces many challenges in realizing its vision, strategy and policies for such a market. Stakeholder knowledge and understanding of forest carbon markets remain limited; new legislation and administrative procedures are still in their early or pilot stages; pressures on forests and conversion

for socioeconomic development remain high; financial incentive mechanisms attractive enough to encourage people to plant forests and provide forest carbon services are absent; and scientific studies providing comprehensive calculations of costs and benefits for stakeholders are missing, making it hard to determine fair and appropriate selling prices and equitable benefit sharing mechanism.

The world is moving towards the implementation of a a *high-quality* forestry carbon market[1] – a term used for markets that aim to achieve the triple goals of **climate integrity**, with carbon credits that deliver verifiable[2], additional[3] and permanent[4] GHG reductions; **biodiversity integrity**, with policies and projects that bring positive biodiversity impacts; and **social integrity**, ensuring equitable benefit sharing and promotion of human rights, gender equity, and the rights of Indigenous People and Local Communities (IPLCs). In Vietnam, however, current policies focus only on improving forest areas and forest carbon stock without taking biodiversity and social safeguards into account.

To achieve its sustainable development and emissions reduction targets, Vietnam needs to identify competitive advantages in the marketplace and develop investment and strategic planning towards a high-value forest carbon market with special focus on biodiversity conservation and social safeguards. The country also needs to refine its legal framework on carbon rights, national carbon registry and monitoring, reporting and verification system. Improving stakeholder capacity; and prioritizing support for small and medium enterprises, communities and ethnic minorities are all important factors that create premises for the sustainable development.

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1 The initiative is considered a central element in the fulfillment of commitments under its Nationally Determined Contribution (NDC), the Glasgow Declaration of Forest and Land Use, NetZero 2050 (Pham et al. 2012, 2019; and 2021) and the newly launched COP 27 Forest and Climate Leaders' Partnership.

2 Emissions reduction must be accurately measured (by an independent third-party) and verified. The formal structures and standards used (e.g. Verified Carbon Standard and Gold Standard) include scientific methodologies, accurate surveillance and regular verification creating confidence and credibility for buyers.

3 Carbon that is sequestered above and beyond business-as-usual, or what would have happened without a carbon project.

4 Ensuring the reduction in emissions is permanent and not likely to be reversed

1 Introduction

Deforestation and forest degradation account for 18% of global greenhouse gas (GHG) emissions. Hence, many countries, including Vietnam consider forest protection and development top priorities for climate change mitigation and adaptation. With its high percentage of forest cover (42%), Vietnam has always been an active participant in international agreements promoting innovative financial and policy solutions for forest protection, such as the *Glasgow Declaration on Forests and Land Use* at COP26 in 2021 and the *Forest and Climate Leaders' Partnership* at COP27 in 2022. Forest-based policies and measures to reduce GHG emissions are also prioritized in Vietnam's updated Nationally Determined Contribution (NDC) submitted in November 2022 (Government of Vietnam 2022a). Vietnam is also seeking for sustainable sources of finance for the forestry sector and for ethnic minority communities in implementing these solutions but has not been successful in achieving this goal (Pham et al. 2018; Trieu et al. 2020; Pham et al. 2022). At the same time, state budgets for the forestry sector have declined overtime leading to challenging in meeting country's commitment in improving both forest quality and forest cover. In recent years, there has been an expectation in Vietnam that establishing and developing a forest carbon market could generate additional revenues for forest protection and development and reducing GHG emissions. However, developing a carbon market in general and a forest carbon market in particular remains challenging for Vietnam as rules for the international carbon market have yet to be unified (Nasralla and Abnett 2022).

This report analyses forest carbon stock potential in Vietnam, as well as updated policies relating to the carbon market in general and a forest carbon market in particular, and relays stakeholders' views and perspectives of opportunities and challenges to operating a forest carbon market. Based on these analyses, the report provides a discussion and policy recommendations for Vietnam in its efforts to develop policy for an effective, efficient and equitable forest carbon market.

2 Methodology

The authors used the following research methods to explore the opportunities and challenges of establishing a forest carbon market in Vietnam:

Policy analysis: The research team reviewed and analysed current policies, regulations and legal frameworks relevant to the carbon market in general and a forest carbon market in particular. The aim of this policy review was to identify existing conditions and policy gaps for the operation of a carbon market in Vietnam.

Literature review: The research team reviewed documents including reports from government agencies, donors, national and international organizations, and academia to explore opportunities and challenges for Vietnam in establishing payments for forest protection and development through carbon markets.

Online stakeholder survey: Fifty four of Vietnam's 63 provinces and cities have forests. To understand the perspectives of provinces and stakeholders on the opportunities and challenges of designing and operating a forest carbon market in Vietnam, the research team sent an online survey questionnaire to the 54 provinces and cities with forest, 21 of which responded. The survey was also aimed at understanding levels of knowledge among stakeholders about forest carbon markets, their perspectives on the advantages and disadvantages of operating a forest carbon market in Vietnam, and gathering any proposals for implementing such a market in the Vietnamese context.

Interviews with relevant stakeholders: To learn more about the opportunities and challenges of operating a forest carbon payments system in Vietnam, the research team conducted interviews with 12 representatives of state agencies, two international businesses and two domestic enterprises wishing to purchase forest carbon credits in Vietnam, as well as two social organizations, and four donor representatives.

Consultation workshop: In order to create a forum for stakeholders to discuss and identify difficulties and challenges to a forest carbon market, the research team organized a consultation workshop on 20 December 2022 in Hanoi. A total of 149 participants from government agencies, research institutions, domestic and international NGOs, local communities and investors attended and voiced their opinions during the workshop.

3 Forest carbon potential in Vietnam

3.1 Emissions and absorption capacity of forests

The Government of Vietnam realizes the important role of the land use, land use change and forestry (LULUCF) sector in mitigating climate change, and has increased its commitment to reducing emissions from this sector in its updated 2022 NDC (Figure 1). Through various policies, programmes and afforestation activities to reduce emissions and improve forest quality, Vietnam succeeded in achieving emissions reductions of 11.1 million metric tons of carbon dioxide equivalent ($MtCO_2e$) from this sector by 2021 (Government of Vietnam 2022a). The forestry sector has great potential to participate in the carbon market as it is the only sector with negative net emissions (Government of Vietnam 2022a). According to Vu (2022), in 2021, Vietnam had 612 million tons of carbon (C) stored in forests, 80% of which was in natural forests. During the 2010–2020 period, the forestry sector emitted around 30.5 $MtCO_2e$ annually and absorbed approximately 69.8 $MtCO_2e$ each year (Vu 2022). Average annual forestry sector emissions fell from 55.4 $MtCO_2e$ during 1995–2000 to 30.6 $MtCO_2e$ during 2010–2020, while average annual absorption increased from -44.5$MtCO_2e$ in 1995–2000 to -69.9$MtCO_2e$ in 2010–2020 (Vu 2022). The forestry sector was also the only sector to achieve negative annual net emissions for the 2010–2020 period at an average of -39.3$MtCO_2e$ $year^{-1}$ (Vu 2022).

According to the Forest Inventory and Planning Institute (FIPI 2020), during the 2010–2020 period, forestry sector emissions were mainly from degradation of natural forest (18.315 $MtCO_2e$ $year^{-1}$), loss of natural forest (11.213 $MtCO_2e$ $year^{-1}$), and conversion of natural forests to plantations (4.737 $MtCO_2e$ $year^{-1}$). Carbon sequestration during the same period was mainly due to natural forest restoration (17.488 $MtCO_2e$ $year^{-1}$), and afforestation including new plantations and reforestation (12.600 $MtCO_2e$ $year^{-1}$).

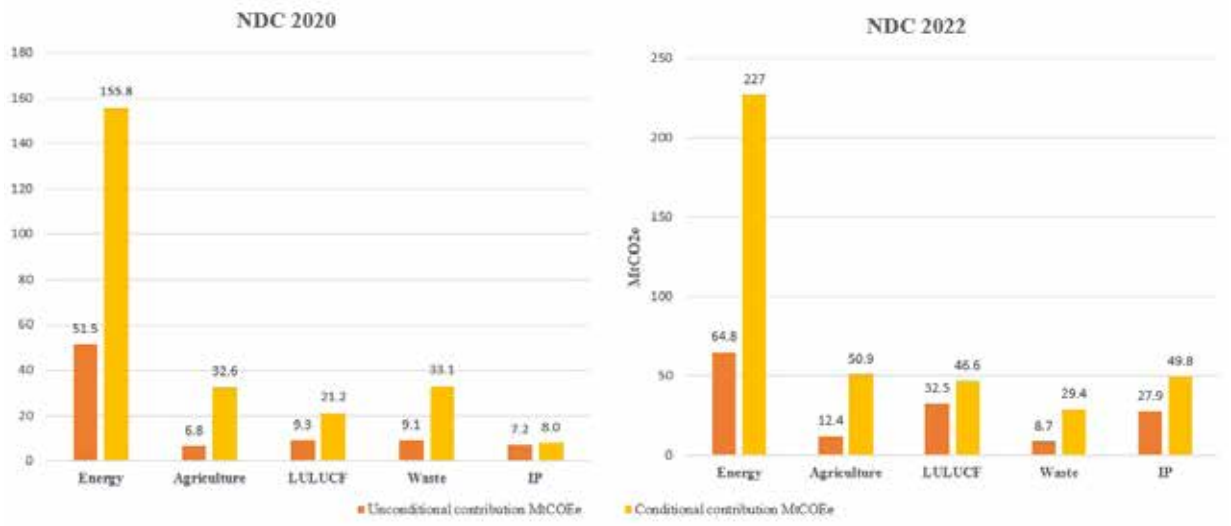

Figure 1. Vietnam's emissions reduction commitments in its 2020 and 2022 NDCs

Source: Government of Vietnam 2022a

3.2 Forest carbon potential by ecoregion

Table 1 shows the Northeast, North Central, Coastal and Central Highlands regions having significant forest carbon potential.

According to Pham (2015), in 2005 and 2010, low and medium carbon stock areas accounted for the largest area and have tended to increase in recent years, while high carbon stock areas have tended to decrease as a result of deforestation and forest degradation. This research also showed the Central Highlands and South Central regions having high forest carbon stock.

Based on interview findings, forest carbon buyers are mainly approaching Vietnam with the aim of carrying out afforestation and reforestation projects to generate carbon credits. Determining appropriate locations for such projects is vital. To date, the Japan International Cooperation Agency (JICA) has conducted studies and thorough analyses to determine the most viable areas for Clean Development Mechanism (CDM) approved afforestation and reforestation (A/R) projects in Vietnam (Figure 3 and Table 2).

Based on the analysis by JICA (2012), most areas with potential for implementing A/R CDM projects are in northern and central regions, with a small number in the south. Its findings were as follows:

- Area of suitable land within 5 km of a main road: 2,436,806 ha
- Area of suitable land between 5 km and 11 km from a main road: 804,411 ha
- Area of suitable land further than 11 km from a main road: 160,257 ha
- Total area of land suitable for A/R CDM projects: 3,401,474 ha
- Total area of land with potential for implementing A/R CDM in Vietnam: 804,411 ha.

In addition, JICA (2012) also provided guidance on locations and viable areas for A/R CDM projects to achieve emissions reduction targets (Table 2).

3.3 Forest carbon potential by forest category

Over the past few decades, Vietnamese scientists have conducted a large number of studies to determine forest carbon stock in different forest types in many localities across the country (Table 3 and Table 4). These have established a favourable scientific basis for the measurement of forest carbon stock and development of technical interventions for future carbon projects.

Table 1. Forest area and forest cover in 2021 and emissions reductions by ecoregion for 2010–2020

Region	Total forest area (ha)	Total natural forest area (ha)	Planted area (ha)	Forest cover (%)	Net ER/ sequestration ($MtCO_2e$ year-1)
Whole country	**14,745,201**	**10,171,757**	**4,573,444**	**42.02**	**59.661**
1. Northwest	1,808,285	1,584,974	223,310	47.06	5.988
2. Northeast	3,970,714	2,331,602	1,639,112	56.34	21.514
3. Red River Delta	83,326	46,326	37,000	6.18	0.816
4. North Central	3,131,061	2,201,435	929,625	57.35	11.676
5. Coastal	2,451,496	1,566,677	884,820	50.43	14.998
6. Central Highlands	2,572,701	2,104,097	468,604	45.94	2.089
7. Southeast	479,871	257,304	222,566	19.42	2.428
8. Southwest	247,748	79,341	168,407	5.44	0.15

Source: MARD 2022a; FIPI 2020

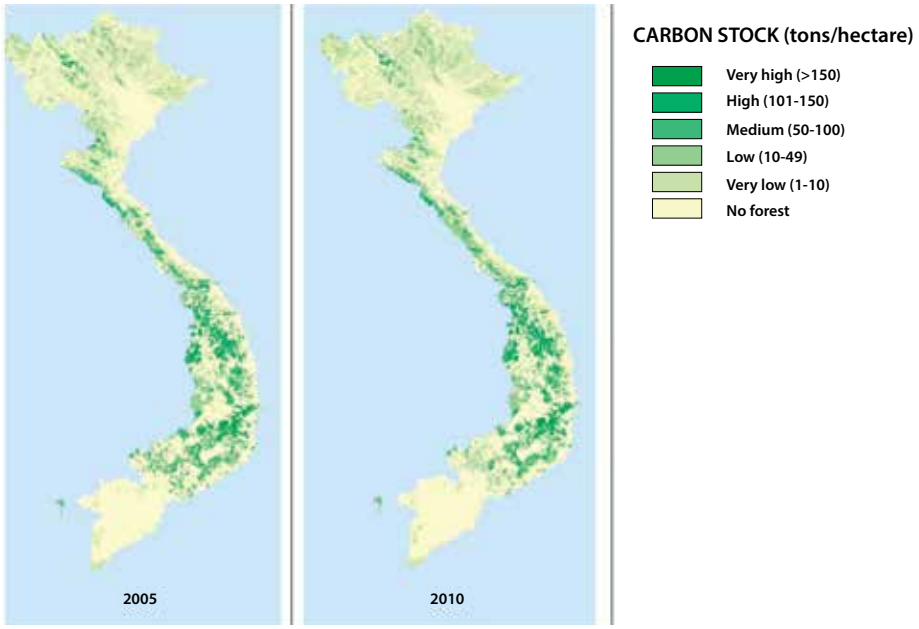

Figure 2. Maps of national forest carbon stock in 2005 and 2010

Source: Pham 2015

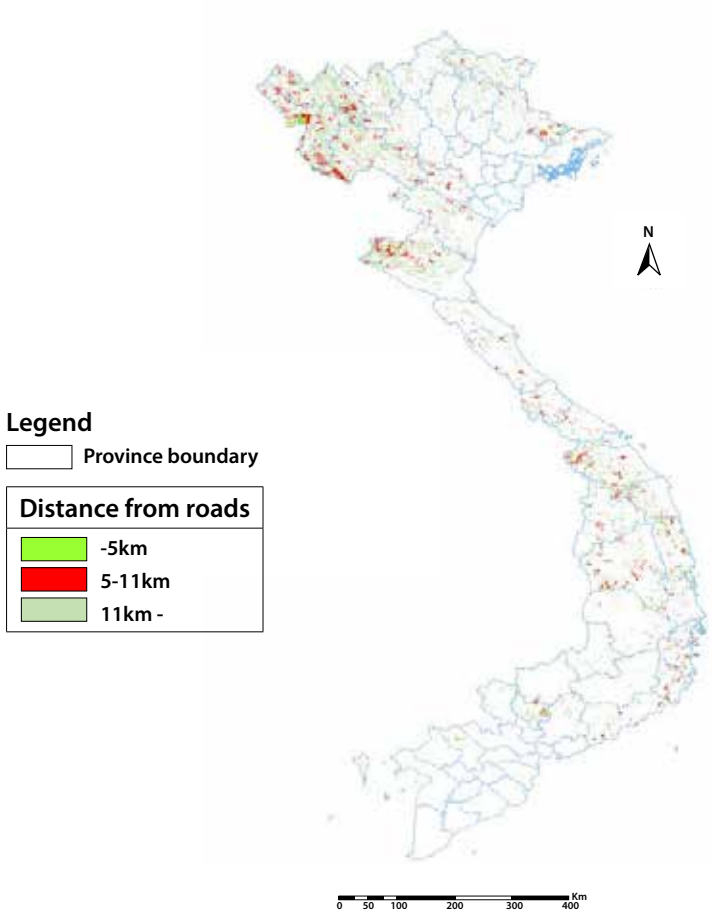

Figure 3. Map of potential areas for implementing A/R CDM projects in Vietnam (JICA 2012)

Table 2. Area and locations suitable for A/R CDM projects (JICA 2012)

Region	Province	Area suitable for A/R CDM projects (ha)			
		Distance from main road			
		0–5 km	5–11 km	>11 km	Total
Northwest	Son La	296,611	97,540	3,015	397,166
	Hoa Binh	48,483	20,548	29	69,060
	Lai Chau	254,186	61,696	4,139	320,021
	Dien Bien	233,789	98,605	46,497	371,708
	Total	**833,069**	**278,389**	**46,497**	**1,157,955**
Northeast	Lao Cai	109,300	16,977	606	126,883
	Yen Bai	66,787	16,060	141	82,988
	Ha Giang	83,302	9,193	71	92,566
	Tuyen Quang	26,260	5,800	1,071	33,131
	Lang Son	87,998	29,736	831	118,565
	Bac Giang	7,378	1,685	0	9,063
	Phu Tho	12,397	3,728	0	16,125
	Vinh Phuc	1,546	1,560	0	3,106
	Cao Bang	96,206	11,730	0	107,936
	Bac Kan	55,661	9,993	310	65,964
	Thai Nguyen	7,444	2,201	0	9,645
	Quang Ninh	29,683	10,592	6,420	46,695
	Total	**583,962**	**119,255**	**9,450**	**712,667**
Red River Delta	Ha Noi	131	574	0	705
	Bac Ninh	0	0	0	0
	Hai Duong	0	0	0	0
	Hai Phong	260	430	0	690
	Ha Nam	179	137	0	316
	Ninh Binh	3,182	170	0	3,352
	Hung Yen	0	0	0	0
	Thai Binh	0	0	0	0
	Nam Dinh	0	0	0	0
	Total	**3,752**	**1,311**	**0**	**5,063**
North Central	Thanh Hoa	97,634	25,994	3,012	126,640
	Nghe An	237,493	71,694	11,388	320,575
	Ha Tinh	23,327	5,103	37	28,467
	Quang Binh	50,064	12,837	1,952	64,853
	Quang Tri	53,651	13,806	185	67,642
	Thua Thien Hue	19,484	11,417	2,743	33,644
	Total	**481,653**	**140,851**	**19,317**	**641,821**

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Table 2. Continued

Region	Province	Area suitable for A/R CDM projects (ha)			
		Distance from main road			
		0–5 km	5–11 km	>11 km	Total
South Central	Da Nang	2,184	659	225	3,068
	Quang Nam	110,151	53,902	15,006	179,059
	Quang Ngai	41,959	13,012	1,340	56,311
	Binh Dinh	60,125	25,044	7,622	92,791
	Phu Yen	36,796	11,612	2,736	51,144
	Khanh Hoa	37,999	25,044	10,587	74,183
	Total	**289,214**	**129,826**	**37,516**	**456,556**
Central Highlands	Lam Dong	4,926	966	212	6,104
	Gia Lai	68,815	50,881	12,138	131,834
	Dak Lak	9,544	8,778	7,444	25,766
	Dak Nong	7,154	2,867	742	10,763
	Kon Tum	49,287	18,188	3,256	70,731
	Total	**139,726**	**81,680**	**23,792**	**245,198**
Southeast	Binh Duong	27,878	10,530	4,088	42,496
	HCM city	167	655	415	1,237
	Ninh Thuan	24,779	14,934	3,631	43,344
	Binh Thuan	26,408	15,744	6,524	48,676
	Đồng Nai	7,787	3,761	4,028	15,576
	Binh Phuoc	259	656	692	1,607
	Tay Ninh	11,759	5,544	399	15,702
	Ba Ria Vung Tau	5,416	1,811	0	7,227
	Total	**104,453**	**51,635**	**19,777**	**175,856**
Mekong River Delta	Long An	0	0	0	0
	Dong Thap	56	839	3,325	4,220
	An Giang	0	0	0	0
	Can Tho	0	0	0	0
	Kien Giang	921	625	583	2,129
	Tien Giang	0	0	0	0
	Ben Tre	0	0	0	0
	Vinh Long	0	0	0	0
	Tra Vinh	0	0	0	0
	Hau Giang	0	0	0	0
	Soc Trang	0	0	0	0
	Bac Lieu	0	0	0	0
	Ca Mau	0	0	0	0
	Total	**977**	**1,464**	**3,908**	**6,349**
Total		**2,436,806**	**804,411**	**160,257**	**3,401,474**

All studies indicate carbon stock increasing with forest age. In addition, forest carbon stock increases sharply after trees are five years old, and even more rapidly from 10 years old and over (Luong et al. 2011).

Table 3. Forest carbon stock by forest type in Vietnam

Forest type	Location	Carbon stock (ton ha^{-1})	Source
Rich forest	Average across the country	123.77–206.23	Vu 2009
Medium forest	Average across the country	100.10–155.49	Vu 2009
Poor forest	Average across the country	84.61–123.88	Vu 2009
Restored forest	Average across the country	66.05–106.27	Vu 2009
Planted forest	Thai Nguyen Province	13.52–53.25	Do et al. 2010
Restored natural forest	Thai Nguyen Province	19.08–35.27	Do et al. 2010
Mangrove (*Rhizophora apiculta* Blume	Ca Mau Province	• A tree with a diameter of 3.2 cm corresponded to carbon stock of 2.0 kg • A tree with a diameter of 35.2 cm corresponded to carbon stock of 641.8 kg • On average, a tree with a diameter of around 12.9 cm corresponded to 95.4 kg of carbon stock in tree biomass • Age grade I forest had carbon stock of 41.6 t ha^{-1} • Age grade II forest had carbon stock of 79.4 t ha^{-1} • Age grade III forest had carbon stock of 101.4 t ha^{-1} • Age grade IV forest had carbon stock of 132.9 t ha^{-1} • Age grade V forest had carbon stock of 154.0 t ha^{-1} • Age grade VI forest had carbon stock of 167.4 t ha^{-1} • The carbon stock value of a forest depended on its growth. The average value of carbon stock for mangrove was from VND 8.1–33.6 million ha^{-1} for age grade I; from VND 15.4–64.2 million ha^{-1} for age grade II; from VND 19.7–81.9 million ha^{-1} for age grade III; from VND 25.8–107.3 million ha^{-1} for age grade IV; from VND 29.8–124.4 million ha^{-1} for age grade V; and from VND 32.5–135.2 million ha^{-1} for age grade VI	Nguyen et al. 2017
Mangrove	Ca Mau Province	The carbon stock stored on the ground for age grade 3 was 111.60 t ha^{-1} and the age grade 4 was 161.34 t ha^{-1}	To 2022
Kandelia obovate	Thanh Hoa Province	The annual carbon absorption of an 18-year-old forest was 19.18 tCO_2 ha^{-1} year^{-1} (equivalent to 70.39 t ha^{-1}); next was a 17-year-old forest reaching 14.76 tCO_2 ha^{-1} year^{-1} (equivalent to 54.17 t ha^{-1}); the lowest was a 16-year-old forest with 14.64 tCO_2 ha^{-1} year^{-1} (equivalent to 53.73 t ha^{-1})	Nguyen and Dam 2017
Litchi chinensis + Eucalyptus	Tam Dao District	16.07 t ha^{-1}	Tran and Le 2009
Litchi chinensis + *Acacia mangium*	Tam Dao District	21.84 t ha^{-1}	Tran and Le 2009
Litchi chinensis + pine	Tam Dao District	20.81 t ha^{-1}	Tran and Le 2009
Dipterocarp forest	Gia Lai Province	• The total biomass of an entire dipterocarp forest stand ranged from 10.48–314.95 t ha^{-1}, where tall trees accounted for about 90% of the total biomass of the entire stand. The biomass of fresh shrubs and fallen trees only accounted for around 10% of total stand biomass • Rich forest had the highest carbon stock at an average of 126.33 t ha^{-1}. Meanwhile, the carbon stock of in reserve area was only 5.34 t ha^{-1} on average	Nguyen 2012

continued on next page

Table 3. Continued

Forest type	Location	Carbon stock (ton ha^{-1})	Source
Canarium album Raeusch plantation	Northeast	At 15 years old with the density of 250 trees ha^{-1}, total carbon stock was 123 t ha^{-1}, while 1 ha of forest could sequester around 8.2 tCO_2 year^{-1}	Luong et al. 2011
Dysoxylum (Meliaceae) plantation	North Central	At 24 years old and a density of 650 trees ha^{-1}, total carbon stock was 300 t ha^{-1}, while 1 ha of forest could sequester around 12.5 tCO_2 year^{-1}	
Chukrasia tabularis forest	North Central	At 30 years old and a density of 350 trees ha^{-1}, total carbon stock was 561 t ha^{-1}, while 1 ha of forest could sequester around 18 tCO_2 year^{-1}	
Pinus caribaea pine plantation	Central Highlands	At the age of 19 in Lam Dong Province, with a density of 700 trees ha^{-1}, total carbon stock was 684 tCO_2 ha^{-1}, while average sequestration was 36 tCO_2 ha^{-1} year^{-1}. In Gia Lai Province, a 20-year-old *Pinus caribaea* plantation with a density of 1,150 trees ha^{-1}, total carbon stock was 913 t ha^{-1}, while average sequestration was 46 tCO_2 ha^{-1} year^{-1}	
Michelia mediocris Dandy plantation	Gia Lai Province, Central Highlands	The carbon volume of a *Michelia mediocris* Dandy plantation was quite low: at seven years old with a density of 875 trees ha^{-1}, total carbon stock was 52 tCO_2 ha^{-1}, while at 25 years old with the density of 500 trees ha^{-1}, carbon sequestration capacity was 419 tCO_2 ha^{-1} year^{-1}	Luong et al. 2011
Tectona grandis plantation	Gia Lai Province, Central Highlands	For a 13-year-old *Tectona grandis* plantation with a density of 500 trees ha^{-1}, total carbon stock was 145 tCO_2 ha^{-1}, while for a 20-year-old *Tectona grandis* plantation with a density of 1,600 trees ha^{-1}, total carbon stock was 645 tCO_2 ha^{-1}	
Khaya senegalensis plantation	Binh Phuoc Province, Southeast	49.5 tCO_2 ha^{-1} year^{-1}	
Hopea odorata plantation		15.6 tCO_2 ha^{-1} year^{-1}	
Dipterocarpus alatus plantation		14 tCO_2 ha^{-1} year^{-1}	
Mangrove	Kien Giang Province	The total biomass of mangroves in Kien Giang reached 549,114 tons, where aboveground biomass was equivalent to 269,089 tons of total stored carbon	GIZ 2011
Eucalyptus urophylla plantations		Total carbon sequestration per hectare of *Eucalyptus urophylla* plantations ranged from 25,479–95,634 kg ha^{-1}	Vo 2009
Grade III A3 status forest	Bach Ma National Park, Hue Province	• CO_2 absorbed by timber trees ranged from 249.31–272.97 t ha^{-1} • Under the forest canopy, small timber trees had the highest CO_2 absorption capacity at 11.74 t ha^{-1} followed by roots at 8.18 t ha^{-1}, while fresh vegetation cover was the lowest at 1.51 t ha^{-1}. The average total CO_2 volume absorbed under the forest canopy in grade III A3 forest was 27.22 t ha^{-1}	Duong and Nguyen 2012
Grade II B status forest		CO_2 absorbed by timber trees ranged from 85.45–89.77 t ha^{-1}	
Natural forest	Ninh Thuan Province	• Aboveground biomass and carbon stock of tropical dry semi-evergreen closed forest were 87.5 t ha^{-1} and 41.1 t ha^{-1}, respectively • Aboveground biomass and carbon stock of tropical dry semi-evergreen forest were 57.0 t ha^{-1} and 26.8 t ha^{-1}, respectively	Trinh 2016
Restored mangroves	Can Gio District	For the whole region, mangrove forests in Can Gio store around 41.5 Tg C, equivalent to 152.3 Tg CO_2e	Luu et al. 2016

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Table 3. Continued

Forest type	Location	Carbon stock (ton ha^{-1})	Source
Mangroves	North region	• Carbon stored in soil of restored mangroves at ages 20–25 (217.74 ±16.82 Mg ha^{-1}), which is not significantly different from those of untouched natural mangroves (300.68 ±51.61 Mg ha^{-1}) • Carbon stored in soil in Quang Ninh Province (323.89 ±28.43 Mg ha^{-1}), which is not significantly different from that of Nam Dinh Province (249.81 ±19.09 Mg ha $^{-1}$), but both are significantly higher than Thai Binh Province (201.42 ±27.65 Mg ha^{-1}) and Thanh Hoa Province (178.98 ±30.82 Mg ha^{-1}) • Differences of carbon stored in soil among provinces may be due to different geological characteristics and mangrove age • There was little variation in carbon stored in soil between mangroves restored with a mixture of mangrove species (289.75 ±33.28 Mg ha^{-1}), *Sonneratia caseolaris* (L.) Engl. (255.67 ±13.11 Mg ha^{-1}) or *Aegiceras corniculatum* (L.) Blanco (278.15 ±43.86 Mg ha^{-1}), but the carbon stored in soil of these mangroves was significantly greater than for mangroves with *Kandelia obovata* Sheue, Liu & Yong (174.04 ±20.38 Mg ha^{-1})	Pham et al. 2020

Source: Data collated from various sources by the authors in 2022

Table 4. Average carbon stock by forest type in different ecoregions in Vietnam

Forest type	North Central	Central Highlands	South Central	Northeast	Northwest	Southeast	Southwest	Red River Delta
Rich evergreen broadleaf	119.3	166.5	160.1	107.4	143.4	115.2	115.2	107.4
Medium evergreen broadleaf	60.5	105.7	107.2	71.9	66.7	79.7	79.7	71.9
Poor evergreen broadleaf	31.1	60.6	57.4	26.2	29.0	47.4	47.4	26.2
Restored evergreen broadleaf	23.8	55.9	56.3	22.5	19.8	36.8	36.8	22.5
Deciduous broadleaf		27.3	26.0			37.0		
Bamboo	3.6	14.7	4.8	3.2	7.8	6.7		3.2
Mixed bamboo	32.3	63.7	85.8	21.1	37.9	64.3		
Coniferous		88.4	88.4					
Mixed broadleaf and coniferous		97.5	97.5					
Mangrove						72.6	72.6	3.4
Rocky mountain with trees	28.8		28.8	17.7	17.7	28.8		
Plantation	20.9	24.4	18.3	12.6	12.0	12.0	26.3	12.6

Source: Pham 2015

4 Legal framework for forest carbon sequestration and storage services

4.1 Current policies relating to forest carbon management in Vietnam

Vietnam is one of the few countries in Asia with a clear legal framework recognizing the role of forest carbon in climate change adaptation and mitigation, and a clear direction for forest carbon trading (Table 5). In general, Vietnamese policies focus on providing three general principles for operating a forest carbon market:

- Provisions on forest carbon sequestration and storage services through the reduction of GHG emissions from reducing deforestation and forest degradation, where sustainable forest management and green growth are considered forest environmental services;
- Provisions on the responsibilities and obligations of all sectors and fields for the implementation of GHG inventories and GHG emissions mitigation measures;
- Determining operational principles for the domestic market based on a phased roadmap and exploitation of financial benefits from carbon sequestration services, and reducing GHG emissions from forests under state ownership in accordance with the Law on Management and Use of Public Property.

Table 5. Policies relating to forest carbon management and trade in Vietnam

Year of issue	Policy	Provisions relating to forest carbon
2015	Civil Code 2015 (Vietnam NA 2015)	Clause 1, Article 105, prescribes property as follows: *"Property is objects, money, valuable papers and property rights"* (Vietnam NA 2015). With the regulation of forest carbon in the form of certified carbon credits, carbon can be considered one of a forest's assets along with timber and non-timber forest products.
2017	Forestry Law No. 16/2017/QH14 promulgated by the National Assembly on 15 November 2017, effective from 1 January 2019 (Vietnam NA 2017a)	This law provides a legal framework on forest ownership, financing and benefit sharing mechanisms for payment for forest environmental services, in which provisions relating to forest carbon payments include: • Article 7, which stipulates forest ownership, specifically: "*The State is the representative of the owner of forests owned by the entire people, including natural forests and planted forests fully invested by the State*". • Clause 10, Article 2, which stipulates that "*Ownership rights to planted production forests include the right to possess, use, and dispose of forest owners over plants, livestock and other properties attached to the forest invested by forest owners within the allocated and leased timeframe for planting forests*". • Clause 2, Article 61, which stipulates that: "*forest carbon sequestration and storage; reducing greenhouse gas emissions from deforestation and forest degradation mitigation, sustainable forest management, and green growth*" is one of five forest environmental services. This provision allows the use of a financial mechanism for forest environmental services based on a service supply and use relationship. This is an off-budget financial mechanism and is not part of the financial mechanism for refundable or non-refundable ODA sources. • A benefit sharing mechanism is specified under Clause 4, Article 73 on the rights of forest owners to: *"Be eligible to provide forest environmental services and benefit from forest environmental services"*. This benefit mechanism has been applied to the forest environmental services specified in Article 63 of this law and guided in Decree No. 156/2018/ND-CP. However, regulations for forest carbon sequestration and storage services have yet to be specified or put into practice.

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Table 5. Continued

Year of issue	Policy	Provisions relating to forest carbon
2017	Decision No. 419/QD-TTg (Vietnam PM 2017): Issued on 5 April 2017 approving the National REDD+ Action Programme to 2030	The objectives of the programme are to provide access to results-based financing sources in line with international requirements; provide solutions for international capital sources, including contributions, sponsorships and trusts from governments, international organizations, non-governmental organizations, businesses, individuals and other financial institutions; and generate revenues from REDD+ implementation, including from forest carbon credit trading. Mitigation interventions include: • Activities to mitigate deforestation and forest degradation: interventions made for conversion of natural forests to other use purposes and forest protection; • Activities aimed at preserving and enhancing carbon stock and sustainable management of forest resources through rolling out business models for high-yield forests and large timber forests; and replicating sustainable natural forest management; forest protection, conservation and restoration models.
2017	Law on Management and Use of Public Property (Vietnam NA 2017b)	This law includes provisions on state management of public property, including natural resources. Forests are a type of resource, and the management of public property is regulated as follows: • The state modernizes and professionalizes the management of public property in order to improve the effectiveness and efficiency of its management and use; and ensure human and financial resources for its management and use (Clause 2, Article 5); • The exploitation of financial resources from public property must comply with the market mechanism, be effective, public, transparent and lawful (Clause 5, Article 6); • Forms of exploiting financial resources from public property (Article 7) include: assigning the right to use public property; granting the right to exploit public property; leasing of public property; transferring the right to exploit and the right to use public property; using public property for business, joint venture or association purposes; using public property to pay state obligations; selling and liquidation of public property; and other forms as prescribed by law. Thus, state agencies (the Ministry of Agriculture and Rural Development (MARD) at the central level, and provincial people's committees (PPCs) at the local level) are representatives of ownership, management and use of the results of forest carbon sequestration and storage, and greenhouse gas emissions reductions for forest areas under the ownership of the people, as stipulated in Clause 1, Article 7 of the Law on Forestry.
2018	Decree No. 156/2018/NĐ-CP	Articles 64 to 75 stipulate provisions relating to the management and use of payments for forest environmental services (Government of Vietnam 2018).
2020	Environmental Protection law	This law clarifies the "organization and development of a carbon market" as an economic tool to promote the reduction of greenhouse gas emissions in the country, thereby contributing to the implementation of Vietnam's emission reduction commitment under the Paris Agreement on climate change. Article 139 clearly stipulates the organization and development of a carbon market, specifically: • Clause 1, Article 139 clearly states that the domestic carbon market includes activities for exchanging greenhouse gas emission quotas and carbon credits obtained from the exchanging and offsetting of carbon credits domestically and internationally in line with the provisions of law and international treaties to which the Socialist Republic of Vietnam is a signatory. • Clause 7, Article 139 stipulates: Greenhouse gas emitters participating in the domestic carbon market shall exchange, auction, borrow, pay back, and/or transfer carbon quotas and credits; and implement carbon credit exchanging and offsetting mechanisms domestically and internationally in line with the provisions of law and international treaties to which the Socialist Republic of Vietnam is a signatory (Vietnam NA 2020).

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Table 5. Continued

Year of issue	Policy	Provisions relating to forest carbon
2020	Nationally Determined Contribution (NDC)	This regulates mitigation measures for greenhouse gas emissions (including increased carbon sequestration), including: • Protecting existing natural forest in mountainous and coastal areas to control deforestation, forest conversion and forest degradation effectively to reduce greenhouse gas emissions; • Planting new protection forests and special-use forests with native tree species on non-forested land to increase carbon sequestration; • Improving the quality and carbon stock of poor natural forests through supplemental planting and forest enrichment to increase carbon sequestration; • Improving ecosystem services; • Improving productivity and quality of plantations to increase carbon sequestration and reduce emissions through the application of advanced techniques (varieties, silvicultural techniques); • Converting short-cycle plantations (5–7 years) to long-cycle plantations (10–15 years); • Applying strict controls over the harvesting of timber from planted forests to produce wood chips for export, with a focus on ensuring the supply of wood materials for domestic sawn timber production and furniture processing; • Establishing sustainable forest management and forest certification to reduce and control emissions from deforestation and forest degradation, forest fires and biomass burning; • Increasing GHG sequestration through improved forest quality, biodiversity conservation and improved ecosystem services; • Establishing and rolling out agroforestry models through additional planting of forest trees and timber species to increase carbon sequestration and combat land degradation, giving priority to sloping land areas. The 2020 NDC committed Vietnam to reducing emissions by 9% unilaterally and by 27% with international support.
2022	Decree No. 06/2022/ ND-CP on Mitigation of Greenhouse Gas Emissions and Protection of the Ozone Layer (Government of Vietnam 2022b)	Provisions relating to forest carbon include: • Clause 2, Article 5, which stipulates that the ministries and sectors in charge, including MARD, must reduce greenhouse gas emissions; • Clause 5, Article 3, which stipulates: "The mechanism for exchanging and offsetting carbon credits is the mechanism for registering and implementing programmes and projects to reduce greenhouse gas emissions and issue carbon credits according to internationally or nationally recognized methods. Carbon credits from programmes and projects are exchanged on the carbon market or to offset GHG emissions in excess of allocated quotas"; • Article 8 on enhancement of greenhouse gas absorption, which stipulates that organizations, households, individuals and communities that are forest owners or land users should develop and implement measures for sustainable forest management; and protect and improve forest cover, biomass and quality in order to increase capacity to absorb greenhouse gases. It also allows them to participate in domestic and international carbon credit exchange and offset mechanisms in accordance with the provisions of law and international treaties to which the Socialist Republic of Vietnam is a signatory; • Article 16, which stipulates that participants in the domestic carbon market can include all organizations, households, individuals and communities specified in Article 8; • Article 8 stipulates emissions reduction levels up to 2030 for different sectors and fields including the agriculture and rural development sector (mainly agriculture, forestry and land use sub-sectors) at 129.8 Mt CO_2e; • Clause 3, Article 9, which stipulates that ministries and branches manage the construction sector and promulgate processes and technical regulations on measurement, reporting and verification of GHG emission reductions within their respective management fields.

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Table 5. Continued

Year of issue	Policy	Provisions relating to forest carbon
2022	Decree No. 08/2022/ ND-CP (Government of Vietnam 2022c)	This decree has provisions on payment for natural ecosystem services (Section I, Chapter X), stipulating that: "Forest environmental services of forest ecosystems shall be applied in accordance with the provisions of the law on forestry". Paid natural ecosystem services include wetland ecosystem services, marine ecosystem services and rocky mountain ecosystem services, caves for business purposes, tourism, recreation decoration, aquaculture, etc. Like the forestry law with its provisions on payment for forest environmental services, this decree has yet to stipulate provisions on carbon sequestration services, GHG emissions reduction, etc.
2022	Decision No. 01/2022/QĐ-TTg (Vietnam PM 2022a) dated 18 January 2022	This decision provides a list of greenhouse gas emitting sectors and facilities that must have GHG inventories. Appendix II of the decision stipulates that 1,662 establishments in provinces and in different fields must inventory GHGs. These are potential participants in the exchange and/or trading of carbon credits to achieve prescribed emissions reduction targets.
2022	National Climate Change Strategy with Vision to 2050 (Vietnam PM 2022c):	Targets for reducing greenhouse gas emissions include: • Ensuring a total national greenhouse gas emissions reduction of 43.5% compared to a business as usual (BAU) scenario by 2030. In which: forestry and land use fields reduce emissions by 70%, and increase carbon sequestration by 20%, total emissions and sequestration should reach at least -95 $MtCO_2e$; • Ensuring facilities with annual greenhouse gas emissions of 2,000 tCO_2e or more reduce their greenhouse gas emissions; • Ensuring total national greenhouse gas emissions reach net-zero by 2050, with emissions peaking by 2035, then declining rapidly. Under this target: forestry and land use fields will reduce emissions by 90% and increase carbon sequestration by 30%, with total emissions and sequestration reaching at least -185 $MtCO_2e$; • Ensuring facilities with annual greenhouse gas emissions of 200 tCO_2e or more reduce their greenhouse gas emissions.
2022	Updated Nationally Determined Contribution (NDC)	The 2022 NDC levels up Vietnam's emissions reduction commitments to 15.8% unilaterally and 43.5% with international support.
2022	Decree No. 107/2022/ NĐ-on Piloting Carbon Payment for Forest Environmental Services in the North Central Region (Government of Vietnam 2022d)	• MARD represents Vietnam in signing agreements to transfer emissions reduction results. • Proceeds from the programme are considered revenues from forest environmental services for carbon sequestration and storage services and accounted for separately from other service revenues. • Implementation costs do not overlap with other state budget expenditures. Spending norms: • For forest protection contracts: the minimum contracted level is equal to the level of support from the state budget for forest protection contracts, and the maximum is no more than twice the level of support from the state budget for forest protection contracts applicable to the same contracted subjects in the same province. Specific levels are determined by the provincial people's committees • The amount for activities to support livelihood development is VND 50,000,000 per residential community per year • For other expenditures: norms shall be applied only in accordance with current provisions in legislation and approved by competent state agencies. The criteria for determining amounts of proceeds to be distributed to each province are based on emissions reduction results and provincial forest area.

In addition to internationally-supported projects, the Prime Minister has also agreed to pilot the development of carbon sequestration and storage services schemes in Quang Nam and Son La provinces (Government of Vietnam Office 2021; Duong and Dai 2022).

Decree 06, the 2017 Law on Forestry and Decree 156 all referring to the establishment of a carbon market in Vietnam has caused much confusion and many questions from stakeholders about which one is applicable to them. Representatives at the consultation workshop on 20 December clarified differences between these pieces of legislation:

- **Decree 06** aims at establishing a domestic carbon market to exchange GHG emission quotas and carbon credits (Box 1) by focusing on three groups of subjects: (i) facilities operating in listed sectors and facilities emitting GHGs obligated to have greenhouse gas inventories as listed in Prime Ministerial Decision No. 1 of 2022 (Figure 4); (ii) entities participating in domestic and international carbon credit exchange and offsetting mechanisms in accordance with the provisions of law and international treaties to which the Socialist Republic of Vietnam is a signatory; and (iii) other entities and individuals involved in investing in and trading greenhouse gas emission quotas and carbon credits in the carbon market. Consequently, any enterprises or investors wishing to invest in forest carbon projects in Vietnam, either according to the international market or voluntarily, can do so on their own initiative but must notify the governing body and the Ministry of Natural Resources and Environment (MONRE).
- **Decree 156** focuses on the formulation of a domestic forest carbon market and voluntary forest carbon market, rather than looking at the international market.

Despite policymaker representatives saying there is no overlap between the two decrees and they do not affect any party's desire to buy forest carbon credits on the voluntary market, other participants remained concerned about avoiding double-accounting and the need for more specific guidance regarding connections between voluntary and mandatory markets.

Box 1. Provisions on exchange of GHG emission quotas and carbon credits on the trading floor of the domestic carbon market (according to Decree 06)

- Facilities can:
  - Bid to own more GHG emission quotas in addition to their allocated quotas in the same commitment period;
  - Transfer any unused GHG emission quota amounts from the previous to the following year in the same commitment period;
  - Borrow GHG emission quotas allocated for the following year for use in the previous year in the same commitment period;
  - Use carbon credits from projects under carbon credit offset and exchange mechanisms to compensate for GHG emissions in excess of the allocated GHG emission quota in one commitment period (not exceeding 10%).
- The Ministry of Natural Resources and Environment shall automatically withdraw any allocated GHG emission quotas if a facility stops operating, is dissolved or goes bankrupt;
- The state shall encourage facilities to return any unused GHG emission quotas voluntarily to contribute towards achieving national GHG emissions mitigation targets;
- At the end of each commitment period, facilities must make payments for any GHG emissions in excess of their allocated quotas after the application of bidding, transferring, borrowing and/or using carbon credits to offset emissions. In addition to such payments, any GHG emissions in excess of the allocated quota shall be deducted from the quota for the subsequent commitment period.

Sectors obligated to conduct GHG inventories	Facilities obligated to conduct GHG inventories
Energy	Facilities with annual emissions of ≥ 3,000 tCO_2e
Transportation	Thermal power plants; industrial production facilities with total annual consumption of ≥1,000 tons of oil equivalent (TOE)
Construction	Cargo transport companies with total annual consumption of ≥1,000 TOE
Industrial processes	Commercial buildings with total annual consumption of ≥1,000 TOE
Agriculture, forestry and land use	Solid waste treatment facilities with operating capacities of ≥1,000 TOE

1,912 facilities in total

Figure 4. List of sectors and GHG emitting facilities in Decision No. 01/2022/QD-TTg dated 18 January 2022

Source: Vietnam PM 2022a

According to interviewees, Decision 01 has had many difficulties in its implementation, particularly with delayed payments by entities obligated to conduct GHG emissions inventories during Covid-19. Moreover, it is not easy to monitor enterprises' emissions levels as most are unfamiliar with policies and proposed measurement methods. There are also differences between large, small and medium enterprises in terms of their willingness to participate in and comply with state legislation on emissions reduction obligations. Large-scale enterprises have sufficient financial resources to do so, and are motivated to reduce emissions and promote sustainability as a brand image strategy to secure their positions in the marketplace. Meanwhile, small-scale enterprises have many difficulties securing the necessary financial resources and technical capacity to comply with this legislation.

4.2 Future forest carbon policy orientation

In order to guide and implement a forest carbon payment mechanism, the Ministry of Agriculture and Rural Development (MARD) is also amending Decree 156 with new orientation in provisions on forest carbon sequestration and storage services and reducing greenhouse gas emissions (Table 6).

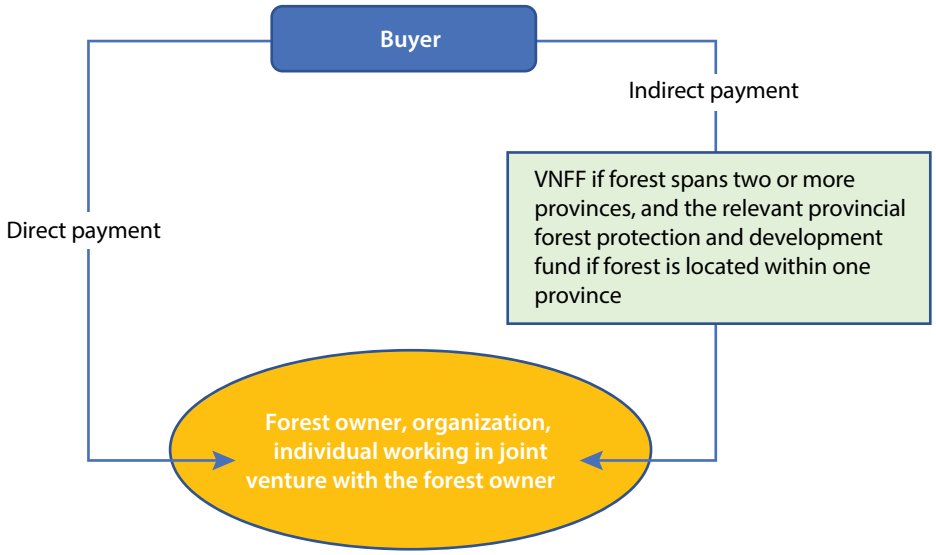

Figure 5. Direct and indirect payments between buyers and sellers

Table 6. Orientation for future policies on forest carbon payments

Factor relating to forest carbon payments	Orientation for future policies*	Challenges**
1. Forest carbon rights	Forest carbon rights are ownership over forest owners' emissions reduction results. Carbon rights include the right to buy, sell, transfer, mortgage, donate, inherit, contribute capital, supply, cooperate and associate with domestic and foreign organizations and individuals, and enjoy benefits from emissions reduction results as prescribed in Clauses 2, 4, 8 of Article 73 of the Law on Forestry	Four aspects require further clarification in the legal framework on identification and determination of forest carbon rights (Pham et al. 2021): i. Ownership of carbon stored in soil and forests; ii. Rights to benefit from the supply and sale of emission reduction services; iii. Rights to transfer and sell carbon credits/emissions rights or a combination of the above mentioned rights; iv. Responsibility (consequences if obligations are not fulfilled). For example, reclaiming ownership of carbon. To date, policies have focused only on the first three aspects and disregarded the consequences of not meeting obligations.
	Rights to sign agreements/contracts relating to forest carbon: • *If the forest area providing emissions reductions spans two or more provinces*, **MARD** shall sign an agreement with the buyer. • *If the forest area providing emissions reductions is located within one province,* the **provincial people's committee** shall sign an agreement with the buyer. • The **forest owner** shall sign an agreement for any project implemented in the allocated forest area.	Clearly determining the parties' rights to sign agreements and contracts can, on the one hand, make the forest carbon trade implementation process clearer for relevant stakeholders; however, the challenge is ensuring any agreements signed by the parties are not duplicated or double reported, and more importantly ensuring they are integrated in national emissions reduction planning.
	In recent discussions on policy and orientation, the assumption has been that where areas are allocated to forest owners who are non-state actors, these actors shall be the carbon rights holders. Conversely, the state shall have carbon rights for forest areas managed by the state.	According to the Constitution of Vietnam, forests are the property of the people and managed by the state. In other words, forest resources, including carbon, can be considered public property even when forest has been allocated to non-state actors. Interpretations of public/private ownership, who beneficiaries are and who has right of ownership remain unclear. Also, in regard to carbon ownership, especially for forest areas owned by the state; a benefit sharing mechanism should be created to encourage investment and motivate all economic sectors to conduct emissions reduction activities, including voluntary ones.

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Table 6. Continued

Factor relating to forest carbon payments	Orientation for future policies*	Challenges**
2. Beneficiaries and payees	Forest owners stipulated under Article 8 of the Law on Forestry include: i. Commune people's committees and other organizations assigned by the state to manage and protect forests; ii. Communities and commune people's committees that participate in forest management contracts with forest owners as organizations; iii. Households, individuals and communities that have forest protection contracts.	In other countries around the world, enterprises that invest in or contribute capital to domestic organizations and individuals for afforestation, forest protection and emissions reduction activities are also entitled to the benefit from forest carbon. However, the legal framework in Vietnam has yet to consider this issue, which may discourage potential investors.
3. Carbon payers	Individuals and organizations that invest in trading and using emissions reductions	As mentioned above, it is necessary to clarify the purpose of the two types of investments by individuals and institutions in order to specify payers and payees accurately. If individuals and organizations only buy emissions reductions, then they are buyers. If individuals and organizations contribute capital to invest or participate in supporting Vietnamese forest owners to trade forest carbon in the marketplace, then they will also wish to share in the proceeds of any forest carbon sales. To date, there are no clear provisions on the obligations of parties involved in carbon credit investment and trade, including obligations to contribute to national emissions reduction targets, or financial or legal provisions (e.g., liability if payments are not made on time).
4. Eligible expenditures	• Mitigating greenhouse gas emissions from controlling and eliminating deforestation and forest degradation; • Reducing greenhouse gas emissions, increasing carbon sequestration through the implementation of sustainable forest management and/or green growth interventions; • Increasing carbon sequestration through afforestation, zoning for natural rehabilitation, additional planting, forest nurturing and natural forest enrichment; • Increasing carbon sequestration through activities to improve the productivity of plantations, application of technical advances, prolonging the plantation cycle; • Conducting other activities to reduce greenhouse gas emissions and increase forest carbon sequestration.	With current forest carbon market development trends, buyers not only look to buy forest carbon credits for volumes of CO_2e captured, but also high value forest carbon through enhancement of forest carbon stock and assurances of biodiversity conservation. However, the current draft policy has no explicit consideration for biodiversity or motivating biodiversity conservation activities. Proposed payment activities mainly focus on storing and enhancing existing forest carbon stock. In addition, guidelines on methods and bases for calculating and determining carbon credits for each type of activity remain unclear in Vietnam.

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Table 6. Continued

Factor relating to forest carbon payments	Orientation for future policies*	Challenges**
5. Procedures and principles for measuring, reporting, validating and verifying results	MARD has provided detailed guidelines on processes for measuring and reporting emissions reductions. The emissions reduction verification process will be carried out by a verification body, which must satisfy requirements specified in Article 14 of Decree No. 06/2022/ND-CP. For the recognition of emissions reduction results: • MARD announces the GHG emission reduction results; • MONRE certifies carbon credits for emissions reduction transfers under domestic and international carbon credit offset and exchange mechanisms.	Currently, guidelines for measuring, reporting and validation procedures focus only on the technical elements of emission measurement. However, for both voluntary and compulsory carbon markets, buyers apply a carbon standard that addresses social factors. The provision, guidance, monitoring and validation of social safeguards are all essential in the field of forest carbon, but have yet to be afforded much attention in Vietnam.
6. Management principles and use of proceeds	• Sources of revenues from payments for forest environmental services (PFES) comply with the provisions of the Law on Forestry. • The Vietnam Forest Protection and Management Fund (VNFF) is the implementing agency that manages and coordinates proceeds based on the performance of provinces sharing watersheds providing PFES. • Provincial funds are the implementing agencies that manage and coordinate proceeds based on performance within the province. • Forest owners organizing the provision of services in accordance with regulations by themselves have rights over the use of proceeds once they have fulfilled their obligations in accordance with the law. • Organizations and individuals that cooperate with and/or enter into joint ventures with forest owners to organize the provision of services are entitled to benefit from performance results through the benefit sharing mechanism once they have fulfilled their obligations. • Proceeds are used to pay for activities to reduce GHG emissions and increase forest carbon sequestration. • When making payments, buyers have two options: direct payment to service providers; and indirect payment (Figure 5) • For indirect payments, VNFF is responsible for distributing payments for forest areas spanning two or more provinces, whereas provincial forest protection and development funds make payments for forest areas located within one province. Forest protection and development funds are permitted to deduct certain percentages in management fees as prescribed (Figure 6 and Figure 7).	Section 2 above indicates payments being made to forest owners, whereas figures 6 and 7 include a principle where payments are made to non-forest owners who participate in emissions reduction activities. Therefore, guidelines should be consistent to facilitate easier implementation for provinces. Having a variety of different entities participating in payment processes may lead to high transaction costs and payment processes taking longer than expected. Currently, management fees are deducted in accordance with current principles under the PFES scheme. However, these fees may be underestimated, particularly where policymakers have yet to fully take the costs needed to supply one ton of CO_2 into account.

Sources: MARD 2022b; *VNFF 2022; **collected and analysed by the authors (2022)

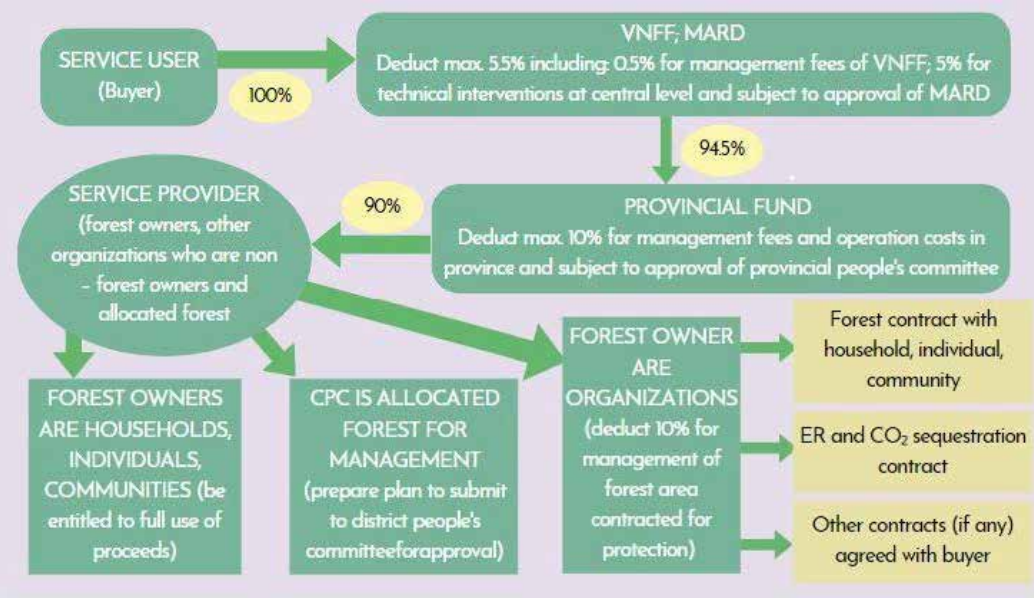

Figure 6. Proposed process for the management and disbursement of proceeds if the forest supply area spans two or more provinces and is managed by the Vietnam Forest Protection and Development Fund

Source: VNFF 2022

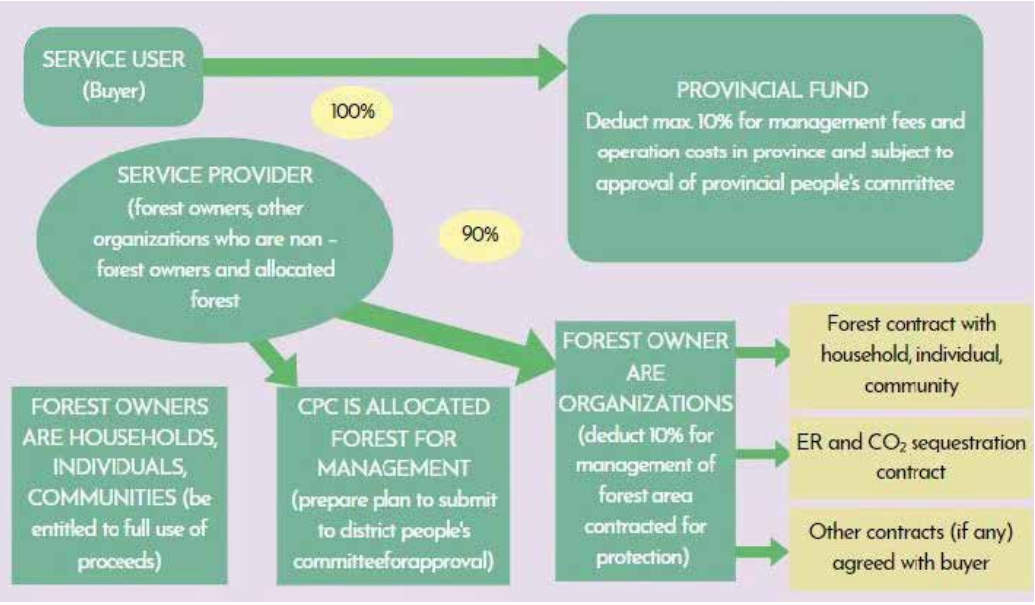

Figure 7. Proposed process for the management and disbursement of proceeds if a forest supply area is located within one province and is managed by a provincial forest protection and development fund

Source: VNFF 2022

4.3 Proposed procedures for developing, registering, approving and appraising forest carbon sequestration and storage provision and GHG emissions reduction schemes and projects

The Ministry of Agriculture and Rural Development has proposed standard procedures for conducting transactions to guide parties wishing to trade in forest carbon (Table 7).

Table 7. Proposed procedures for forest carbon service provision scheme/project development, registration, approval and appraisal

Step 1. Complete an application form
The application form shall include: general information, objectives, activities and expected results of forest carbon sequestration, carbon storage and GHG emission reduction as prescribed. Application forms are provided and guided by the Ministry of Agriculture and Rural Development.
Step 2. Submit the application form
• If the forest area providing forest carbon services is located **within one province**, the parties – including forest owners or units and individuals – should pay a close attention to announcements on deadlines for submitting applications on the **Department of Agriculture and Rural Development** website and submit the application form accordingly. It is expected that the Department of Agriculture and Rural Development will post such notices before January 30 each year. • If the forest area providing forest carbon services **spans two or more provinces**, the parties – including forest owners or units and individuals – should pay a close attention to announcements on deadlines for submitting applications on the **Ministry of Agriculture and Rural Development** website and submit the application form accordingly. It is expected that the Ministry of Agriculture and Rural Development will post such notices before January 30 each year. • Within 20 working days from the end of each quarter, the Ministry and departments of agriculture and rural development shall consolidate, approve and post a list of approved applications for subsequent registration for scheme/project development.
Step 3. Submit a project/scheme dossier application for approval
• The forest owner or relevant forest protection and development fund shall take prime responsibility for developing the provision of forest carbon sequestration and storage and/or GHG emissions reduction service scheme/project according to legislation. • A provision of forest carbon sequestration and storage and/or GHG emissions reduction services project/scheme dossier submitted for approval shall include: an application for approval of the project/scheme (original); a project/scheme document with details as prescribed in Step 1 above (original). • The forest owner or relevant forest protection and development fund shall submit one set of documents as specified in the point above directly or via postal service or electronic mail to the Ministry of Agriculture and Rural Development for a project/scheme that spans two or more provinces or to the relevant department of agriculture and rural development for a project/scheme located within one province. • From the date it receives the application, the Ministry or relevant department of agriculture and rural development shall notify the entity/individual submitting the application about its eligibility within three (3) working days for an application submitted directly; and within five (5) working days for an application submitted via postal service or electronic mail. The time limit for supplementing and completing the application shall be no more than 30 days from the date of notification. • Within 45 days of the date it receives the completed application, the agency specified above shall appraise it, make a decision on its approval and notify the forest owner or relevant forest protection and development fund.

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Table 7. Continued

Step 4. Approve the project/ scheme
• The Ministry of Agriculture and Rural Development shall organize the appraisal and approval of a detailed project/scheme implemented in two or more provinces. • The relevant provincial people's committee shall appraise and approve a scheme implemented within one province. • The forest owner or relevant forest protection and development fund shall organize the implementation of the approved scheme, making sure to address the signed contents and schedule. If there are any changes or additions during the implementation process, the forest owner or relevant forest protection and development fund must report such changes to the competent authority for written approval.
Step 5. Measure, report and verify emissions reduction results
• Methods for measuring, reporting and appraising emissions reduction results shall comply with regulations from the Ministry of Agriculture and Rural Development. • In the case of a forest owner providing a forest carbon sequestration and storage and/or GHG emissions reduction service , they shall register to develop a project/scheme and carry out measurement and reporting of forest carbon sequestration and storage and/or GHG emissions reduction results. • The verification of emissions reduction results is carried out by a verification body, which must meet requirements as prescribed in Article 14 of Decree No. 06/2022/ND-CP dated 7 January 2022.
Step 6. Verification and recognition of emission reduction results
• Forest owners, organizations and/or individuals shall submit emissions reduction result dossiers directly or via postal service or electronic mail to the Ministry of Agriculture and Rural Development. • A dossier for recognition of emissions reduction results shall include: the original application for recognition of emissions reduction results using the form prescribed by the Ministry of Agriculture and Rural Development; the original report on the measurement of carbon sequestration and storage and/or GHG emissions reduction results; and the original verification report on the results of carbon sequestration and storage and/or GHG emissions reduction from the verification body. • From the date of receipt, the Ministry of Agriculture and Rural Development shall notify the applicant on the eligibility of the application within three (3) working days for an application submitted directly; and within five (5) working days for an application submitted via postal service or electronic mail. The time limit for supplementing and completing the application shall be no more than 30 days from the date of notification. • Within 45 days of the date it receives an eligible application, the Ministry of Agriculture and Rural Development shall make a decision on recognizing the results of forest carbon sequestration and storage and/or GHG emissions reduction; send its decision to the forest owner or relevant forest protection and development fund; and notify the Ministry of Natural Resources and Environment. • In the case of an emissions reduction results transfer under a domestic and/or international carbon credit exchange or offset mechanism, then provisions under Article 18 of Decree No. 06/2022/ND-CP shall be applied.

Source: MARD 2022b

5 Opportunities for forest carbon market in Vietnam

Feedbacks from provincial stakeholders taking part in only survey reveal that, key enabling conditions for Vietnam to establish a carbon market are the state political wills to develop such market encouraging the development of such a market, along with stricter requirements and commitments on climate change and emissions reduction (Figure 8).

Political commitment: Having a strong political commitment to reducing emissions, and a stable political system, Vietnam is recognized as a solid market for investment. In addition, this commitment also creates enabling conditions and legal corridors for developing a forest carbon market and for encouraging provinces to develop their own forest management, protection and development policies towards reducing emissions through participation in such a market (Son La Province People's Committee 2022).

Many potential buyers have shown interest: Taking into account the increasingly strict environmental and emissions reduction regulations, an increasing number of companies operating in Vietnam and abroad are looking for investment and carbon credit trading opportunities. Around 48% of provinces participating in the online survey agreed with this perspective (Figure 8), which suggests a great opportunity for Vietnam's forestry industry. However, only 5% of surveyed provinces said potential buyers had contacted them directly enquiring about emissions reduction transactions. Therefore, it is necessary to develop comprehensive policies to promote such investments, together with procedural guidelines and incentive mechanisms to attract investors to this special type of forestry industry service. Interviews with relevant stakeholders indicate a sharp increase over the past two years in numbers of potential buyers coming to Vietnam with a view to purchase forest carbon. To date, however, only a few projects and purchase agreements are either underway or in their planning stage in Vietnam (Table 8).

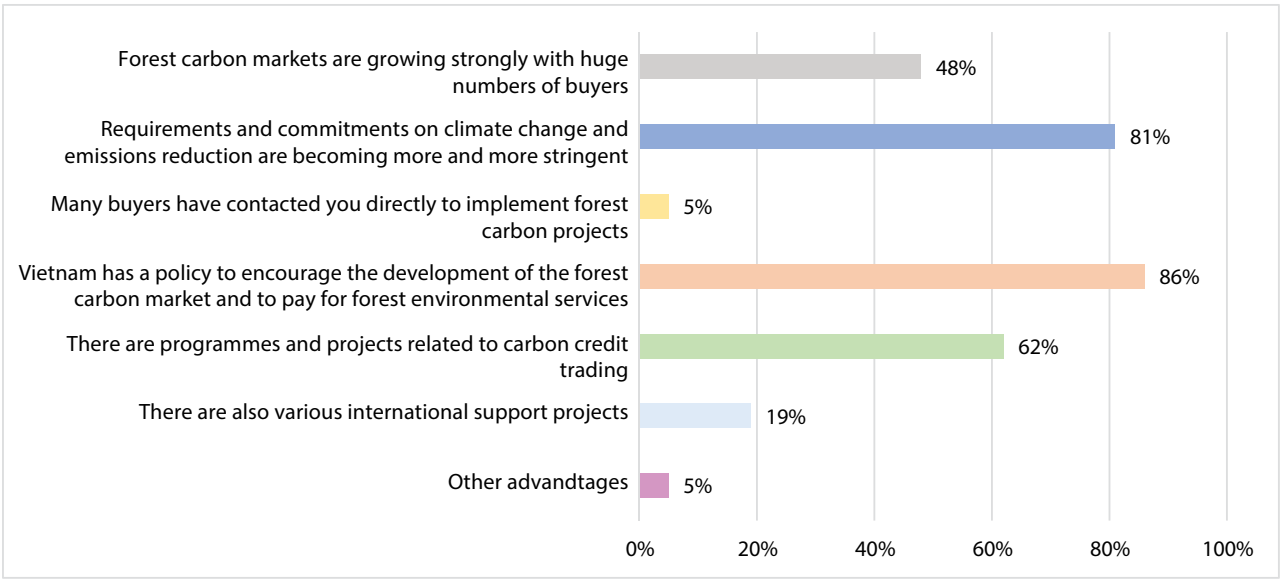

Figure 8. Surveyed provinces' views concerning forest carbon payment implementation in Vietnam

Table 8. Forest carbon trade agreements and potential projects in Vietnam as of December 2022

Project/ programme	ERPA with the World Bank	LoI with Emergent (LEAF)	Feasibility study for an ER project with SK Forest	RECAF project proposal for ER payments by GCF	Project proposal for ER payment in northern Vietnam, prepared by JICA for submission to GCF
ER payment period	2018–2025	2022–2026	For the duration of the project	12 years (initial and expansion phases of 6 years each)	2023–2028
Location	Six provinces in North Central Region	11 provinces in South Central and Central Highlands regions	15 provinces proposed	Four provinces: Dak Lak, Dak Nong and Lam Dong in Central Highlands and Ninh Thuan in South Central	Northern provinces proposed
Activities for payment	REDD+ interventions including ER and carbon sequestration enhancement	REDD+ interventions	REDD+ interventions including ER and carbon sequestration enhancement	REDD+ interventions	REDD+ interventions
Potential ER volume in project sites	25 $MtCO_2e$	11 $MtCO_2e$	Estimated 30 $MtCO_2e$ for 2022–2030		48.6 $MtCO_2e$
Agreed ER volumes	Transfer of 10.3 $MtCO_2e$	Tentative transfer of 5.2 $MtCO_2e$	Not yet defined	-6,684,338 tCO_2e	Tentative transfer of 48.6 $MtCO_2e$
Carbon purchase price	USD 51.5 million (equivalent to USD 5 tCO_2e^{-1})	Proposed USD 10 tCO_2e^{-1}	Initial price discussed is at least USD 10 tCO_2e^{-1}, dependent on agreement conditions	USD 5 tCO_2e^{-1}	USD 5 tCO_2e^{-1}
Agreement conditions	95% of transferred ER volume will return to Vietnam to contribute to NDC	Draft contract available and contract terms undergoing discussion	Not yet defined, negotiations still ongoing		Sell part of CO_2e volume sequestered through REDD+ efforts from 2014–2018
Debates and issues causing implementation delays	ERPA decree approved by the government on 28 December 2022 Benefit Sharing Plan finalized and ready for issuance by MARD	Mainly over the contract as Emergent applies US law on commercial trade, which MARD is unfamiliar with	SK Forest and VNForest still working on draft Feasibility Study report and draft LoI Investment modality still unclear	The large project size and number of stakeholders involved, with funding sources including grants and ODA loans from IFAD and GCF	Both sides still working on proposal; pending issues include MARD as focal point; spending items/interventions and project provinces; and ODA or payment project

Sources: Vu 2022; VNFF 2022

International technical support: Vietnam has received significant support from international organizations to develop the capacity of stakeholders in forest carbon issues. One example is Quang Nam Province receiving forest carbon payment capacity support from foreign organizations such as the United States Agency for International Development (USAID); a KfW10 project on integrated protection and management of forest ecosystems supporting the protection and sustainable management of natural production forests; and a UNDP Green Climate Fund project on improving the resilience of coastal communities vulnerable to climate change-related impacts in Vietnam (2017–2022) (Tran 2021).

Experience from implementing the Payment for Forest Environmental Services (PFES) scheme and international payment programmes such as the North Central Region Emissions Reduction Payment Agreement (ERPA): Although the forest carbon market is still new to most stakeholders in Vietnam, the country has had plenty of experience implementing PFES since 2002 (Pham et al. 2013; Pham et al. 2022), with different pilot projects and national policies, as outlined in section 3 of this report. In addition to strengthening the capacity of different stakeholders, these projects and policies have also breathed new life into a market mechanism that encourages non-forestry stakeholders to take a greater interest in forest protection and development.

6 Challenges for forest carbon market in Vietnam

According to feedback from provinces participating in the online survey, the most significant challenge to implementing forest carbon payments involves technical issues relating to forest carbon measurement, verification and reporting (Figure 9).

Stakeholder knowledge and capacity to implement forest carbon projects are limited: Although many provinces are interested in participating in forest carbon exchange, transfer and trade, 57% of those participating in the survey had no forest carbon projects (Figure 10). For those provinces where forest carbon projects are either underway or have been recommended, 14% were undergoing preliminary discussions on forest carbon projection, while 5% had a policy, but still faced difficulties with implementation. Interviewees and participants in the online survey said forest carbon is a new concept to them, with 95% of provincial governments saying they had no or little experience or knowledge regarding forest carbon.

Vietnam has yet to finalize a social safeguards policy, which is a key stumbling block for potential donors and buyers of forest carbon services, and causes reluctance to buy carbon credits. As only 29% of the survey provinces were aware of social safeguards, any efforts to raise awareness of and develop capacity to implement forest carbon projects should prioritize and focus on this important element. In addition, as forest carbon projects necessitate adherence to buyers' methodologies, stakeholders require training and capacity building on different market requirements to enable them to choose appropriate projects and implement them correctly, effectively and at reasonable cost.

Regulations and administrative procedures are unclear and overlap: Discussions on the rules of an international carbon market are still ongoing, and countries have yet to reach a consensus. Vietnam needs to improve its domestic legal foundation in parallel and consider new and

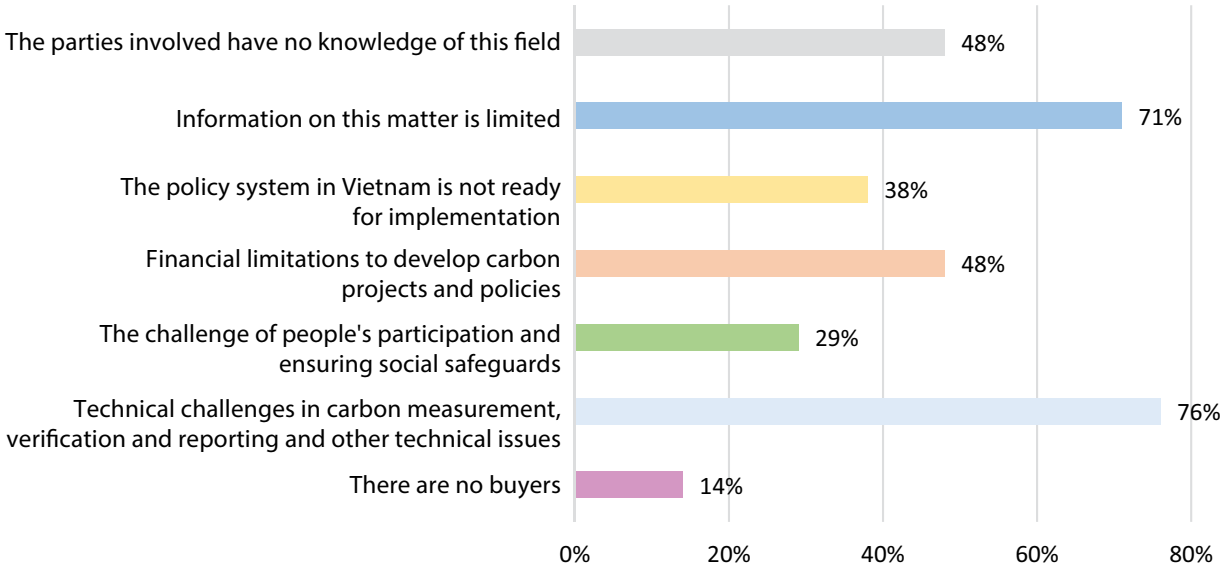

Figure 9. Surveyed provinces' views concerning challenges to operating a forest carbon market in Vietnam

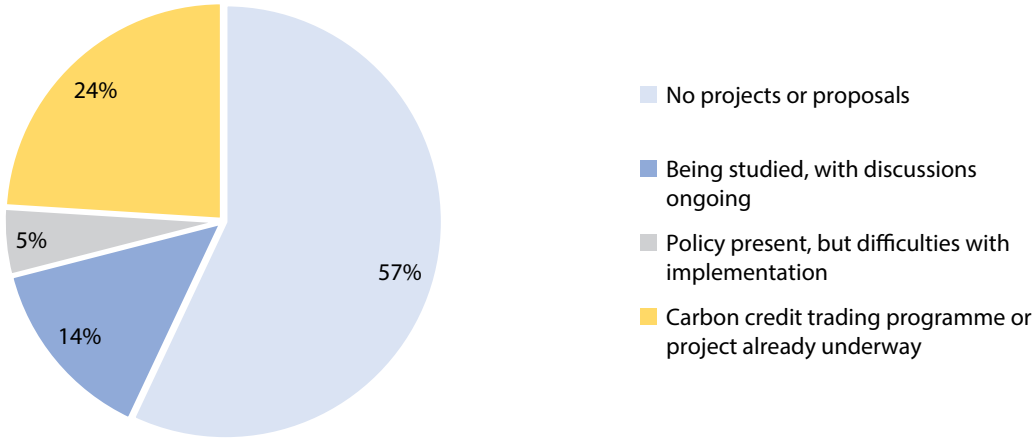

Figure 10. Percentages of surveyed provinces implementing forest carbon services

upcoming regulations to harmonize its legislation. In addition, as discussed in previous sections, key issues, such as who owns forest carbon rights; procedures for registration, verifying, monitoring and recognition of carbon credit certificates; and high transaction costs need to be addressed and resolved to create favourable market conditions for both buyers and sellers. Even when participating in the voluntary market, those provinces with forest carbon projects also feel the strict screening processes required when signing contracts with foreign enterprises, and dossier and forest carbon credit verification by international organizations also cause them many difficulties (Tran 2021).

Further, land ownership issues and the fact that many ethnic minority people directly involved in forest protection and development are not recognized as legal forest owners can also cause many difficulties in implementing forest carbon payment schemes (Tran 2021). According to General Administration of Forestry officials, Vietnam still lacks regulations on a GHG inventory system; transparent and accurate GHG emissions monitoring systems at national, sectoral, sub-sectoral and production facility levels that can meet international standards; clear GHG emissions reduction roadmaps for each sector and sub-sector; and legal guidance to ensure compliance with and flexibility to the requirements of different markets (Khanh 2021).

Pressure on forests remains high: Though many provinces are either implementing or wish to participate in the forest carbon market, they recognize there are challenges to doing so with deforestation of natural forests for residential land, industrial crops, mining, etc. and construction of hydroelectric power plants (Tran 2021; Hoang 2022; Quang Nam People's Committee 2022). Inconsistent policies also have negative impacts on forest protection. For example, provinces' calls for investors to produce agricultural expansion and consequently leads to deforestation and forest degradation (Tran 2021).

Determination and negotiation of selling prices, by weighing up and balancing costs and benefits: To date, determining the selling price to serve as a premise for negotiations with buyers is the issue of most interest to many parties. With carbon market prices fluctuating and depending on different carbon standards, selling prices may become higher in the future than they are at present due to demand outstripping supply. Determining a carbon price as the basis for negotiations with buyers plays a crucial role in ensuring net benefits from forest carbon projects in Vietnam. However, discussions between parties currently focus only on selling prices and benefits without taking into account the associated costs the government, stakeholders and forest owners will have to bear in creating forest carbon credits for sale. Such expenditures include costs of creating policies and enabling market conditions; capacity building for parties to implement forest carbon projects; opportunity costs; implementation costs; costs of implementing measures to conserve, improve and plant new forests; and costs for monitoring and verification and implementing the payment process. According to JICA (2012), to implement projects under the Clean Development Mechanism through Afforestation and Reforestation (A/R CDM), it is necessary to calculate and consider both costs and benefits (Box 2).

Box 2. Costs and benefits of A/R CDM projects in Vietnam (JICA 2012)

- Benefits:
  - Profit from selling wood products
  - Carbon credit value (CER)
  - Social value in creating jobs and income for local people
- The total area of potential land for A/R CDM project implementation in Vietnam in 2012 was 804,411 ha. Assuming a CER price of USD 5 tCO_2e^{-1}, and all potential land for A/R CDM projects nationwide is afforested or reforested, then the profit from CER sales over a 30-year period would be:
  - USD 112,569,275 by year 5 and year 20
  - USD 577,462,525 by year 10 and year 25
  - USD 823,724,908 by year 15 and year 30
  - Assuming a discount rate of 10%, the net present value (or net profit) from implementing a nationwide A/R CDM project over 30 years would be USD 243,909,970
- Costs:
  - Afforestation/reforestation activities
  - Ensuring the crediting process is accepted in the CDM framework
  - Transportation
  - Forest protection: USD 541,600,000
  - Monitoring: USD 2,236,000
  - Transaction fees: USD 54,383,600

In addition, the annual submission of dossiers and the fact that one buyer may have multiple dossiers will lead to high administrative and transaction costs. To be able to trade, buy, sell and transfer forest carbon credits, a strict screening process is expected which includes the preparation of documents/dossiers; approval of project documents by an international organization; the granting of forest carbon credits; and trading in the marketplace (Tran 2021). As this whole process will be so costly, it is vital to have specific and comprehensive studies on the costs that parties will have to expend in order to determine the selling price necessary to ensure net profits. Such studies could provide the basis for negotiations with potential buyers.

Lack of financial mechanisms attractive enough to encourage people to participate in large forest carbon projects and programmes: As discussed above, forest carbon stock increases gradually with the age of a forest. Therefore, the orientation for Vietnam is to switch from short-cycle to long-term plantations. However, people are only familiar with growing acacia trees to meet demand for immediate income, while the risk of investing in perennial afforestation is high, and in doing so it is not possible to access banks' concessional loans or appropriate risk insurance policies (Tran 2021).

Stakeholders expect that forest carbon projects will create financial incentives through market-based agreements between buyers and sellers. However, inflexible rules on spending norms like those under the Northern Region Emissions Reduction Payment Agreement (ERPA) do not follow a market mechanism and fail to provide any financial incentive for forest owners to participate more actively in carbon projects rather than traditional forest protection and development programmes.

The challenge of restoring and regenerating poor and degraded forests and promoting biodiversity conservation: Section 3 of this brief shows that emissions reductions in Vietnam have come mainly from the enhancement of carbon stock in poor and degraded forests. However, interview outcomes indicate poor forest restoration efforts facing many difficulties, particularly when such forests are often targeted for development projects. It is worth noting that in current afforestation and reforestation programmes, stakeholders still focus only on expanding the area of forest cover, rather than prioritizing and developing guidance and

financial mechanisms to encourage biodiversity enhancement-based afforestation and reforestation. Even the Northern Region ERPA focuses more on carbon stock and forest area, and affords limited attention to encouraging biodiversity conservation, forest quality improvement or positive social impacts.

Involvement of communities and ethnic minorities: Even though Vietnam's socioeconomic development, forest development and forest carbon market policies are aimed at supporting local people and communities, the fact that most forests are managed by state entities makes it difficult for local communities to participate in and directly benefit from forest carbon trading. In addition, the costs involved in setting up a forest carbon project are significant, while the forest areas that households and communities manage are often small, thus creating high transaction costs that make buyers less interested in investing in forest carbon because the expenditure involved is not commensurate with the benefits obtained. Moreover, land disputes and the fact that local people lack forest use certificates also create many challenges to making payments for forest carbon. Another issue is that under current guidelines, notices on submitting applications for forest carbon credit projects are posted on the executing agency's website, which means local communities with no Internet access may have difficulty accessing such information.

7 Conclusions and recommendations

Vietnam's forestry sector in general and carbon market in particular have great potential for the development and expansion of a forest carbon market. However, to fully optimize this potential and develop forest carbon policies and projects, Vietnam needs to conduct scientific studies that provide convincing and reliable evidence to support upcoming policies, and consider an appropriate roadmap and orientation for Vietnam based on the following recommendations:

Identify competitive advantages in Vietnam's market, and develop strategic investment and planning towards a high-value forest carbon market: Even though Vietnam has significant forest carbon potential, it is difficult to compete with other countries with much larger areas and reserves of forest carbon, such as China, Brazil, Indonesia, Peru and the Democratic Republic of the Congo. Identifying competitive advantages will help Vietnam define its special products and markets more clearly. One considerable competitive advantage is targeting the high-value forest carbon market segment – a trend that global businesses and buyers are looking for. To achieve this goal, it will be necessary to consider which forest areas should be prioritized, and ensure supporting policies focus on improving forest quality; areas facing deforestation and forest degradation threats; and sites that are valuable in terms of biodiversity conservation, and have a positive impact on local communities.

Build a digital carbon credit registration, monitoring and traceability system, and establish systems for monitoring and information management: In other countries, records of management can be kept through the provision of accounts on national carbon registry hubs for parties wishing to trade in forest carbon. Vietnam needs to consider developing and perfecting a similar carbon registration and traceability system to minimize transaction and management costs and create an open regulatory environment for private investment. Developing an effective forest carbon credit registration, monitoring and traceability system lies not only in the implementation process, but also in the capacity of stakeholders to apply that process. Vietnam needs to develop a carbon assessment and appraisal system through the establishment of national verification bodies with expertise and certification equivalent to international certification standards; develop a national carbon credit registration system to manage and call for investment in the market; and build capacity for staff involved in this system. In addition, it is vital to have updated maps and to forecast future trends in forest carbon to show the spatial distribution and visualization of the distribution of carbon stocks in ecological regions over each period of time. Data on average carbon stock for different forest types, and carbon maps for ecoregions are important factors for calculating carbon stock in forests in various conditions and carbon stock variations by cause over periods of time. Such data can provide solutions specific to different activities so they can increase carbon stock in order to protect and develop forests in a sustainable manner (Pham 2015).

Meet national emissions reduction commitments, ensuring competitive advantage for domestic enterprises: Although many buyers have paid attention to Vietnam's forest carbon market, and many provinces and cities are eager to sell forest carbon, according to central-level policymakers it is important to prioritize and ensure Vietnam fulfils its emissions reduction commitments before trading forest carbon credits in the international marketplace. In addition, in the context of emissions reductions having become a mandatory global trend, businesses and key economic sectors from all countries, including

Vietnam, are required to ensure their commitment to reducing emissions as a precondition to being licensed to operate and conduct trade. Therefore, it is important to afford careful consideration to prioritizing domestic enterprises by ensuring they own forest carbon credits to create a competitive advantage.

Refine the policy framework: Although there is already a legal framework relating to forest carbon, Vietnam needs to continue improving existing policies, including those on sustainable forest management. It also need to support the expansion of certified sustainable management forest areas; expand large timber plantations; developing safeguards; and clarify carbon rights, including those over carbon ownership, rights transfers, carbon credit trading and forest carbon entitlements, as well as responsibilities with each of these rights.

Select options and interventions to maximize forest carbon potential and biodiversity, and ensure social security: The research results from various sources listed in Table 3 show the carbon accumulation capacity of forests increasing gradually with age, indicating a need for policies to protect existing forests and establish large areas of perennial timber forests. Tables 3 and 4 both show different forest types having different carbon stock values, and even the same forest types having different values in different locations. Therefore, careful consideration on selecting the right species, in the right place with the right interventions is essential. The details in tables 3 and 4 also demonstrate carbon stock tending to be higher in mixed and multi-species plantation forests than in monoculture plantations. Further, in addition to enhancing carbon stock, mixed-species planting will also help to increase biodiversity. It will be necessary to make full use of available carbon stock calculation results to reduce initial project preparation costs and help parties negotiate.

Build the capacity of stakeholders and prioritize support for small and medium enterprises, communities and ethnic minorities: As mentioned earlier, stakeholder capacity for and understanding of forest carbon is limited. Therefore, capacity building for buyers, sellers and local communities is an important precondition for ensuring the efficiency, effectiveness and fairness of forest carbon markets. With limited resources available, the government and stakeholders should prioritize support for small and medium enterprises and local communities with limited or no financial capacities.

References

Do HC, Tran QH, Tran DT. 2010. Rapid assessment of above ground carbon stock of some vegetation status in Tan Thai commune, Dai Tu district, Thai Nguyen province. *Journal of Agriculture and Rural Development*:38–43.

Duong A and Dai Q. 2022. *Quang Nam and Son La share experiences on forest carbon credits.* Quang Nam Radio-Television Station. Accessed 23 December 2022. https://www.qrt.vn/kinh-te/quang-nam-va-son-la-chia-se-kinh-nghiem-ve-tin-chi-cacbon-rung/

Duong VT and Nguyen TD. 2012. Research on the ability of consequesting carbon dioxide of Bach Ma Special Forest in Nam Dong District, Thua Thien Hue Province. *Hue University Journal of Science* 71(2):291–298. http://hueuni.edu.vn/portal/data/doc/tapchi/264.pdf?fbclid=IwAR1DhNq47Cp3Ts7_0QABT-7Nlg_-9DsHwvBcTSOkYeFBwzS76gQ_ZATcDEw

FIPI (Forest Inventory and Planning Institute). 2020. *Report on the results of the implementation of the national forest resource inventory, assessment and monitoring project, period 2016–2020*. Ministry of Agriculture and Rural Development, Ngoc Ha, Ba Dinh, Ha Noi.

GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit). 2011. *Biomass and Carbon Research: Research Report in Kien Giang Province.* http://coastal-protection-mekongdelta.com/download/library/98.BiomassNCarbon2011KG_VN.pdf?fbclid=IwAR0b7GWDfD9ECBZoXKAbHd_b-RUyXasaWlbIV-ZpySqeIMd8fA7JJfxmzJs

Government of Vietnam Office. 2021. *Official dispatch No. 3479/VPCP-NN dated 26 May 2021 of the Government Office on the development of a pilot project on forest carbon credit business*. Ha Noi, Vietnam.

Government of Vietnam. 2022a. *Nationally Determined Contribution (NDC)*. Ha Noi, Vietnam. https://unfccc.int/documents/622541

Government of Vietnam. 2022b. *Decree No. 06/2022/ND-CP dated 07 January 2022 of the Government on mitigation of greenhouse gas (GHG) emissions and protection of ozone layer.* Ha Noi, Vietnam.

Government of Vietnam. 2022b. *Decree No. 08/2022/ND-CP dated 10 January 2022 of the Government elaboration of several articles of the Law on Environmental Protection.* Ha Noi, Vietnam.

Government of Vietnam. 2022c. *Decree No. 107/2022/ND-CP dated 10 January 2022 of the Government on piloting carbon payment for forest environmental services in the North Central region.* Ha Noi, Vietnam.

Government of Vietnam. 2018. *Decree No. 156/2018/ND-CP dated 16 November 2018 of the Government on enforcement of the Law on Forestry*. Ha Noi, Vietnam.

Hoang Q. 2022. *Quang Nam, two illegal gold yards operating in the natural forest*. Cong an newspaper. Accessed 23 December 2022. https://congan.com.vn/vu-an/phong-su/hai-bai-vang-trai-phep-hoat-dong-ram-ro-trong-rung-tu-nhien_133482.html

IPCC (Intergovernmental Panel on Climate Change). 2022. Summary for Policymakers. *In* Shukla PR, Skea J, Slade R, Al Khourdajie A, van Diemen R, McCollum D, Pathak M, Some S, Vyas P, Fradera R, et al., eds. *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK and New York, NY, USA: Cambridge University Press. https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf

JICA (Japan International Cooperation Agency). 2012. *Research on Forest and Soil Potential in*

relation to "Climate Change and Forestry" in the Socialist Republic of Vietnam. Final report. Vietnam. https://openjicareport.jica.go.jp/pdf/12067989_01.pdf?fbclid=IwAR2KvytAH-wMfM_XvqntX4PxgP2qzkALsGLiU8hkZ-VTfofeiirWt_HyfU62w

Khanh L. 2021. *Great opportunity for Vietnam's forest carbon trade*. Tai nguyen moi truong newspaper. Accessed 23 December 2022. https://baotainguyenmoitruong.vn/co-hoi-lon-cho-thuong-mai-cac-bon-rung-cua-viet-nam-322759.html

Luong VT, Vu TP, Luong XH. 2011. *Research on the effectivity of carbon sequestration values of big timber plantations in Viet Nam*. Vietnamese Academy of Forest Sciences. http://vafs.gov.vn/vn/wp-content/uploads/sites/2/2011/12/5-Tien.Hap-thu-Cacbon.pdf?fbclid=IwAR1DhNq47Cp3Ts7_0QABT-7Nlg_-9DsHwvBcTSOkYeFBwzS76gQ_ZATcDEw

Luu VD, Nguyen TT, Mai TN, Koji O. 2016. Carbon storage in a restored mangrove forest in Can Gio Mangrove Forest Park, Mekong Delta, Vietnam. *Forest Ecology and Management* 380:31–40. https://doi.org/10.1016/j.foreco.2016.08.032

MARD (Ministry of Agriculture and Rural Development). 2022a. *Decision No. 2860/QD-BNN-TCLN dated 27 July 2022 announcing the current state of national forests in 2021.* Ha Noi, Vietnam.

MARD. 2022b. *Draft Decree amending and supplementing a number of articles of Decree No. 156/2018/ND-CP dated 16 November 2018 of the Government detailing the implementation of a number of articles of the Law on Forestry*. Ha Noi, Vietnam.

Nasralla S and Abnett K. 2022. *U.N. carbon market talks to drag beyond COP27 as deals elusive*. Reuters. Accessed 23 December 2022. https://www.reuters.com/business/cop/un-carbon-market-talks-drag-beyond-cop27-deals-elusive-2022-11-17/

Nguyen TH, Vien NN, Nguyen TH. 2017. Carbon sequestration value of *Rhizophora apiculata* Blume at Ca Mau. *Journal of Forestry Science and Technology* 6:101–107. https://vnuf.edu.vn/documents/4400543/5834237/13.Nguyen.Thi.Ha.pdf?fbclid=IwAR1fLan_xtWEUa-z69BihmhXeUkO7ldY0Cw7hqIdX1Xjk-Bq85qFKP9RNscyg

Nguyen THH and Dam TD. 2017. Assessment of Carbon Pool Formation by Pure Planted *Kandelia obovata* Sheue, Liu & Yong Forest in the Coastal Area of Da Loc Commune, Hau Loc District, Thanh Hoa Province. *VNU Journal of Science: Natural Sciences and Technology* 33(3):14–25. https://doi.org/10.25073/2588-1140/vnunst.4516

Nguyen VT. 2012, *Determination of carbon stocks in dipterocarp forests in Gia Lai province* [Master's thesis]. Ha Noi, Vietnam: VNU University of Science. https://repository.vnu.edu.vn/bitstream/VNU_123/9066/1/01050000700.pdf?fbclid=IwAR3AMbYdmwYET1vv8au1EgwZrczwjjlnpQv4wt2Mq489ta2B1rnCiE1-7Fo

Pham HT, Nguyen THH, Vo VT, Mai ST, Pham VQ, Sharma S, Mackenzie RA. 2020. A comparison of soil carbon stocks of intact and restored mangrove forests in Northern Vietnam. *Forests* 11(6):660. https://doi.org/10.3390/f11060660

Pham NB. 2015. *Calculating carbon to build a forest carbon map in Vietnam*. Forest Resource and Environment Center. Ha Noi, Vietnam. Accessed 23 December 2022. http://frec.com.vn/tinh-toan-cac-bon-xay-dung-ban-do-cac-bon-rung-o-viet-nam?fbclid=IwAR17NI11M0PSZJdZTH9pYDay29Vzr3Ud5saRtiGXZXQ6CYQ7fBjbYUmc9-0

Pham TT, Bennett K, Vu TP, Brunner J, Le ND, Nguyen DT. 2013. *Payment for forest environmental services in Vietnam: From policy to practice*. Occasional Paper 98. Bogor, Indonesia: CIFOR. https://www.cifor.org/publications/pdf_files/OccPapers/OP-98.pdf

Pham TT, Dao TLC, Hoang TL, Bui TMN, Pham HL, Nguyen VD. 2018. *Opportunities and challenges in mobilizing finance to implement Vietnam's Forestry Development Strategy for 2006–2020*. Occasional Paper 191. Bogor, Indonesia: CIFOR. https://doi.org/10.17528/cifor/007081

Pham TT, Hoang TL, Dao TLC, Tran NMH, Nguyen TVA, Nguyen TTA. 2021. *Experience of 87 countries in determining and transferring carbon rights*. Occasional Paper 218. Bogor, Indonesia: CIFOR. https://doi.org/10.17528/cifor/007992

Pham TT, Vu TP, Nguyen TML, Hoang TL, Tran NMH. 2022. *Institutional setting for nature-based solutions and REDD+ policies and projects in Viet Nam*. Occasional Paper 232. Bogor, Indonesia: CIFOR. https://doi.org/10.17528/cifor/008614

Quang Nam People's Committee. 2022. *Decision No. 2781/QD-UBND dated 17 October 2022 of the Quang Nam People's Committee on the adjustment and removal of the forest protection and development planning of Quang Nam Province in the 2011–2020 period for the area proposed to be relocated for the purpose of using the forest for other purposes*. Quang Nam, Vietnam.

Son La People's Committee. 2022. *Plan No. 259/KH-UBND dated 31 October 2022 of the Son La People's Committee on the implementation of the national strategy on climate change in Son La Province*. Son La, Vietnam.

To TH. 2022. *Initial estimation of carbon stocks for payment for forest environmental services to improve people's livelihoods in the ecological restoration subdivision, Mui Ca Mau National Park*. Mui Ca Mau National Park. Accessed 23 December 2022. https://vuonqgmcm.camau.gov.vn/wps/portal/?1dmy&page=vqgmcm.trangchitiet&urile=wcm%3Apath%3A/vuonquocgiamuicamau_library/noidungtrang/sdfrteyrs1/truluong

Tran BD and Le QD. 2009. Rapid assessment of carbon accumulation capacity of some agroforestry practices in the buffer zone of Tam Dao National Park, Vinh Phuc Province, Vietnam. *Journal of Agriculture and Rural Development* 136:93–98.

Tran HP. 2021. *Export of forest carbon credits*. Quang Nam newspaper. Accessed 23 December 2022. https://baoquangnam.vn/lam-nghiep/xuat-khau-tin-chi-cac-bon-rung-112402.html?fbclid=IwAR30f-K5X1cgWgw2TmTzPXCnpr0O5UjuUNXcS8HuBzW8aSwzFy43pWIyHUg

Trieu VH, Pham TT, Dao TLC. 2020. *Achieved results of Vietnam forestry development strategy 2006–2020 and recommendations for the Vietnam Forestry Development strategy 2021–2030, with vision to 2050*. Occasional Paper 209. Bogor, Indonesia: CIFOR. https://doi.org/10.17528/cifor/007795

Trinh MH. 2016. *Study on the carbon accumulation capacity of natural forests in Ninh Thuan province* (Doctor of Science dissertation). Ho Chi Minh City, Vietnam: Nong Lam University – Ho Chi Minh City. https://pgo.hcmuaf.edu.vn/data/Trinh%20Minh%20Hoang.pdf?fbclid=IwAR1N2RpSMBi8Q_MaNJC0_su3Zp5ZFFiBfG1ILMN1NDCo4Wpikysa9y-ixlQU

Vietnam NA (Vietnam National Assembly). 2020. *Law on Environmental Protection No. 72/2020/QH14 dated 17 November 2020*. Ha Noi, Vietnam.

Vietnam NA. 2017a. *Law on Forestry No. 16/2017/QH14 dated 15 November 2017*. Ha Noi, Vietnam.

Vietnam NA. 2017b. *Law on Management and Use of Public Property No. 15/2017/QH14 dated 21 June 2017*. Ha Noi, Vietnam.

Vietnam NA. 2015. *Civil Code No. 91/2015/QH13 dated 24 November 2015*. Ha Noi, Vietnam.

VNFF (Vietnam Forest Protection and Development Fund). 2022. *Regulatory orientation for forest carbon sequestration and storage services in Vietnam.* Presentation from the national workshop on a post-COP27 carbon market and roadmap for Vietnam. Ha Noi, Vietnam.

Vietnam PM (Vietnam Prime Minister). 2022a. *Decision No. 01/2022/QD-TTg dated 18 January 2022 of the Prime Minister promulgating a list of sectors and facilities emitting greenhouse gases that must take inventory of greenhouse gases*. Ha Noi, Vietnam.

Vietnam PM. 2022b. *Decision No. 896/QD-TTg dated 26 July 2022 of the Prime Minister approving the national strategy for climate change until 2050*. Ha Noi, Vietnam.

Vietnam PM. 2017. *Decision No. 419/QD-TTg dated 05 April 2017 of the Prime Minister approving the national programme on reduction of greenhouse gas emissions through the mitigation of deforestation and forest degradation; conservation and enhancement of forest carbon stocks and sustainable management of forest resources through 2030.* Ha Noi, Vietnam.

Vo DH. 2009. Study on the carbon sequestration ability of the *Urophylia* plantations in Vietnam. *Journal of Agriculture and Rural Development* 1:102–106.

Vu TP. 2022. *Forest carbon trade in Vietnam.* Presentation from the national consultation workshop on a post-COP27 forest carbon market and roadmap for Vietnam. Ha Noi, Vietnam.

Vu TP. 2009. *Study on forest values in Vietnam*. Science and Technics Publishing House. Vietnam.

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This report aims to identify forest carbon potential, review relevant policies, and explore opportunities and challenges for Vietnam to develop and operate a forest carbon market. The report also provides recommendations for Vietnam and other stakeholders on developing effective, efficient and equitable forest carbon policies and projects.

To achieve its sustainable development and emissions reduction targets, Vietnam needs to identify competitive advantages in the marketplace and develop investment and strategic planning towards a high-value forest carbon market with special focus on biodiversity conservation and social safeguards. The country also needs to refine its legal framework on carbon rights, national carbon registry and monitoring, reporting and verification system. Improving stakeholder capacity; and prioritizing support for small and medium enterprises, communities and ethnic minorities are all important factors that create premises for the sustainable development.

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