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Vietnam Forestry Development Strategy

Implementation results for 2006–2020 and recommendations for the 2021–2030 strategy

Trieu Van Hung
Pham Thu Thuy
Dao Thi Linh Chi

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Trieu Van Hung
Independent consultant

Pham Thu Thuy
Center for International Forestry Research (CIFOR)

Dao Thi Linh Chi
Center for International Forestry Research (CIFOR)

Center for International Forestry Research (CIFOR)

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View from Northern Landscape, Vietnam.

CIFOR
Jl. CIFOR, Situ Gede
Bogor Barat 16115
Indonesia

T +62 (251) 8622-622
F +62 (251) 8622-100
E cifor@cgiar.org

cifor.org

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List of acronyms

CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species
DARD	Department of Agriculture and Rural Development
FES	Forest environmental services
FPDP	Forest Protection and Development Plan
FSSP	Forest Sector Support Partnership
FDI	Foreign direct investment
FLEGT	Forest Law Enforcement, Governance and Trade
GDP	Gross domestic product
GoV	Government of Vietnam
MARD	Ministry of Agriculture and Rural Development
NF	Natural forest
NTFP	Non-timber forest product
ODA	Official development assistance
PF	Planted forest
PFES	Payment for forest environmental services
PTF	Protection forest
TPSFD	Target program for sustainable forestry development
SFE	State Forest Enterprise
SFM	Sustainable forest management
SUF	Special-use forest
VFDS	Vietnam Forestry Development Strategy
VNFOREST	Viet Nam Administration of Forestry
VPA	Voluntary Partnership Agreement
VNFF	Vietnam Forest Protection and Development Fund

Executive summary

The Vietnam Forestry Development Strategy (VFDS) is one of the country's most important plans for the forestry sector. The strategic directions, objectives and solutions within it differ from time to time, depending on the political goals and perspectives of the moment, as well as the role that the forestry sector plays in Vietnam's overall socio-economic development. Regardless of such changes, inheriting lessons learned, developing the next strategy off the back of the experience gained from solving previous challenges, and taking advantage of opportunities, are always the top priorities of the Government of Vietnam.

Vietnam's first forestry development strategy, introduced in 2006, aimed to transform the forestry sector moving it away from a traditional approach which valued forests only for direct benefits like timber, towards a recognition of wide-ranging indirect benefits like environmental services. This strategic refocus embraced sector, landscape and value chain approaches, as well as environmental and forest ecological services approaches. The first strategy will end in 2020; as such, the Ministry of Agriculture and Rural Development (MARD) and the Viet Nam Administration of Forestry (VNFOREST) are in the process of developing a Forestry Development Strategy for 2021–2030, with a vision to 2050. This report is the result of a collaboration between the Center for International Forestry Research (CIFOR) and the Vietnam Administration of Forestry (VNFOREST); it is intended to provide VNFOREST with input as they develop the new strategy. Based on secondary document research and stakeholder interviews, the report reviews achievements and challenges in the implementation of VFDS 2006–2020, as well as provides recommendations for policy makers to consider in the process of developing the new strategy.

Research results show that, by 2020, Vietnam had exceeded a number of the goals set out in VFDS 2006–2020, including: (i) accelerating the growth of production value in the sector; (ii) increasing the export value of wood and forest products; (iii) increasing domestic wood production; and (iv) planting protection forest (PTF) and special-use forests (SUF). However, the forestry sector still faces many challenges when it comes to other key performance indicators, such as: (i) increasing the area of production forests (PDF) with certification of sustainable forest management (SFM); (ii) increasing large-diameter timber production; (iii) increasing revenue for forest environmental services (FES); (iv) securing forest and forest land for the purposes of allocation and leases; (v) reducing the number of poor households in forestry areas; and (vi) increasing the rate at which forestry workers are trained.

Although some anticipated targets were not achieved, others were exceeded, for example: forest cover; reforestation after logging; reduction of forest protection violations; and scattered tree planting. That these goals were achieved or exceeded is the result of strong political commitment, policies trend-matching the market, improvements in central and local management capacity, the active support of international donors, and the involvement of civil society and the private sector. That some targets were not achieved is due to the challenges of implementing policy effectively, efficiently and equitably at grassroots level, lack of resources and funding, and some ambitious goals and targets not being realistic in the current economic, political and market contexts.

Addressing these challenges requires a new approach and more effective economic, social and technical solutions. Development of VFDS 2021–2030 and the 2050 vision needs to consider the implementation achievements and challenges of the previous policy, as well as how to align with global trends, and balance these with the current political, economic and social development context in Vietnam. The direction of the new strategy must also be considered in the context of international requirements, to facilitate the mobilization of domestic and foreign financial resources to help modernize the industry, as well as enhance the forestry sector's role and value in terms of poverty reduction, sustainable economic development and ensuring sustainable forest ecosystems.

1 Introduction

VFDS 2006–2020 was approved by the Prime Minister of Vietnam in Decision No. 18/2007/QD-TTg dated 5 February 2007. Over the last 15 years, the forestry sector has implemented this strategy through various different programs, plans and projects. This has resulted in many important achievements, contributing to increased awareness around the importance of forest resources and attracting the attention and support of the whole society for them, as well as actively contributing to socio-economic development, environmental protection and climate change objectives (VNFOREST 2020a).

Besides these achievements, the forestry sector also saw some shortcomings, such as restricted planning and planning management, land disputes and the violation of forest protection and development regulations, which in some places were serious. Likewise, although overall forest area has increased in Vietnam, forest quality remains low; natural forest (NF) has recovered slowly, the productivity of planted forest (PF) has been improved but is still low, resulting in small-diameter timber which does not meet raw material demands of the processing and export industries (VNFOREST 2020a).

The year 2020 marks an important milestone in the process of formulating policies, strategies and plans for socio-economic development of the country, as well as for Vietnam's forestry sector. The review and evaluation of VFDS 2006–2020 implementation, and the development of the next VFDS, are essential foundations for development in the forestry sector overall. To support implementation of this strategic review, evaluation and development, MARD has issued Decision No. 4587/QD-BNN-TCLN dated 9 November 2017.

This report is a joint product of the Center for International Forestry Research, and the Planning and Finance Department of the Vietnam Administration of Forestry, Ministry of Agriculture and Rural Development. The objective of the report is to fully and objectively assess the results of the implementation of the VFDS 2006–2020, to analyze the achievements as well as the shortcomings, limitations and causes, drawing lessons learned as a basis for proposing and recommending issues to be considered and solved in the development of the VFDS for 2021–2030, with a vision to 2050.

The report is built on the basis of an overview of secondary sources, including reports of central and local government agencies, reports of domestic and foreign organizations, local reports on the results of VFDS 2006–2020 implementation, combined with the results of consultation with representatives of 32 related organizations.

2 Methods

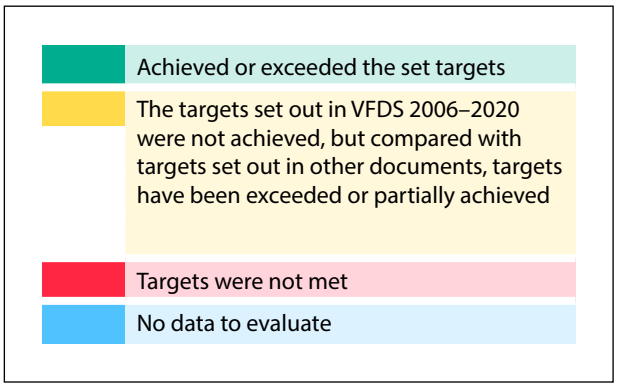
This report is based on three approaches.

Review of secondary documents. The research team reviewed scientific reports, as well as reports from donors, government agencies, domestic and foreign research institutions and enterprises. These reports related to the effectiveness of forestry policy implementation during 2006–2020, as well as proposals around the development of Vietnam's forestry strategy during 2021–2030 and the 2050 vision. The authors also consulted 49 reports relating to VFDS 2006–2020 implementation in 49 provinces and cities that have forests. Provincial reports were written in response to VNFOREST's request, through Document No. 1549/TCLN-KHTC dated 3 October 2019.

In-depth interviews with organizations and independent experts. The authors interviewed 22 state agency officials and 18 experts from related organizations. These interviews focused on:

- the achievements and challenges of implementing VFDS 2006–2020
- stakeholders' perspectives on the strategic direction that forestry development should take in the next stage
- directions and lessons learned from implementation of other strategies, for example, the National Science and Technology Strategy, Biodiversity Conservation Strategy, Forest Sector Research Strategy, Human Resources Training Strategy, and Decree 99 and 156 on Payment for Forest Environmental Services (PFES)
- the results of implementing forestry programs and plans, and proposed directions for the 2021–2030 period.

Traffic light evaluation. To facilitate our assessment, we used a traffic light system to assess the achievement level of the various targets and programs outlined in VFDS 2006–2020.



3 General information on the 2006–2020 strategic objectives, orientation and approach

VFDS 2006–2020 was approved by the Prime Minister in Decision No. 18/2007/QD-TTg with the overall goal of:

'*Establishing, managing, protecting, sustainable development and use of 16.24 million ha of land planned for forestry; increase the percentage of forested land to 42–43% by 2010 and 47% by 2020; ensure broad participation of economic sectors and social organizations in forestry development to contribute increasingly to socio-economic development, protect ecological environment, conserve biodiversity and provide environmental services, contribute to poverty reduction, improve living standards for rural mountainous people and maintain national security and defense*'.

VFDS 2006–2020 provided four strategic directions (Figure 1) and seven implementation solutions (Figure 2) through five programs (Figure 3), with the total capital required for implementation estimated at VND 33,885.34 billion, to be sourced from: state budget (23.9%); state-issued credit scheme (15.6%); official development assistance (ODI) (13.1%); state enterprises and cooperatives (11.3%); foreign direct investment (FDI) (24.5%); and other sources (0.4%).

In reality, implementation of VFDS 2006–2020 has not been organized according to the programs approved in Decision 18 of the Prime Minister, but instead according to the programs and projects that have been issued in the three respective phases of the strategy (2006–2010, 2011–2016 and 2017–2020). Evaluation of progress and implementation results are outlined in the following sections.

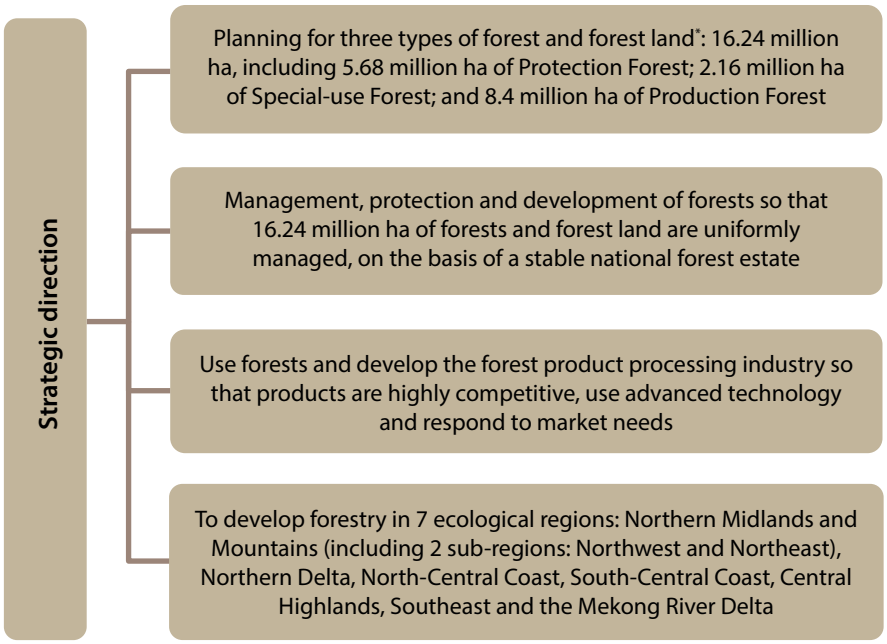


Figure 1. The four strategic directions underpinning VFDS 2006–2020

* In Vietnam 'forest land' is land assigned by the government for forestry purposes. As such, it may not be forested, but the intention is for it to become forested.

Figure 2. The seven branches of strategy implementation

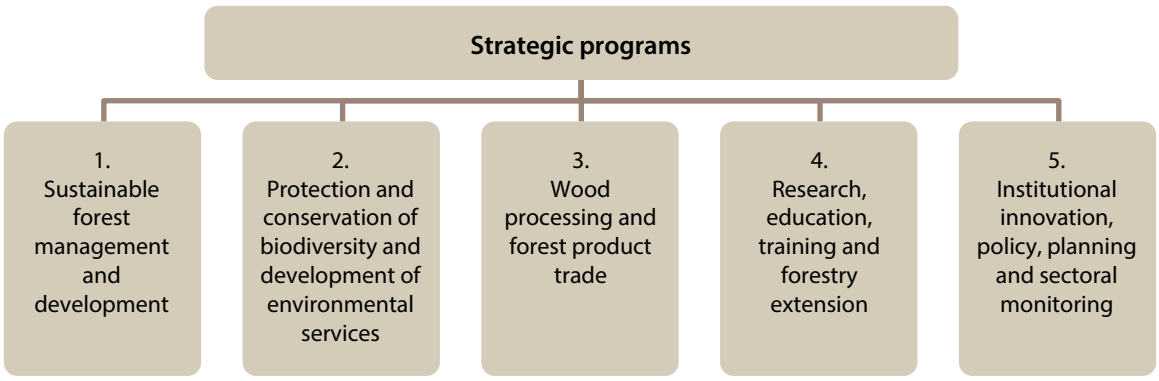


Figure 3. The strategy's five target programs

3.1 Implementation during 2006–2010

During 2006–2010, implementation of the 5 million ha reforestation project was continued (Program 661 according to Decision 661/QD-TTg dated 29 July 1998 of the Prime Minister). To implement this reforestation project, a State Steering Committee and Central Project Management Board were established centrally, according to the Decision of the Prime Minister; in the localities, a Provincial Steering Committee was established by the leader of the Provincial People's Committee, along with a provincial-level Project Management Unit, headed by the leader of Department of Agriculture and Rural Development (DARD). Project management units were also established at grassroots level (GoV 2011). This same system of executive steering was maintained and strengthened in the following stages, although it went under a different name.

VFDS 2006–2020 was formulated with the active and effective support of many international organizations through the Forest Sector Support

Partnership (FSSP) that provided comprehensive direction for development of the forestry sector. Since 2004, so as to monitor the sector, the FSSP has supported MARD to develop a Forestry Sector Monitoring Information System (FORMIS) with a set of 36 indicators. In 2006, this set of indicators was revised and supplemented to monitor and evaluate implementation of VFDS 2006–2020; the revised version included 72 indicators, of which 15 were key indicators, but at that time there was no data available for the purposes of monitoring and evaluation; these were thus named 'future indicators'. The indicator set is divided into four groups: i) the overarching goal, with four indicators; ii) specific economic, social and environmental targets, with 13 indicators; iii) program-related performance targets, with 47 indicators; and iv) inputs, including 8 indicators (MARD, FSSP 2010).

The 2006 Forestry Sector Report, which outlines the above-mentioned criteria system, is considered to be the baseline report from which to monitor and oversee implementation of VFDS 2006–2020. In 2010, MARD with support of the FSSP, developed a 'Forest Sector Progress Report 2006–2010' to analyze changes in the forestry sector over the first five years of strategy implementation, looking at reasons behind the achievement and failure of important sector targets, as well as forestry development trends in Vietnam and the world. This report made recommendations.

According to MARD and FSSP (2010), during 2006–2010, the forestry sector achieved several important achievements:

- forestry activities shifted from state-based to social forestry, with many economic sectors getting involved; the key players in reforestation activities were local households, while in forest product processing, private enterprise played a critical role.
- forestry projects were implemented effectively. In particular, Project 661 and official development assistance (ODA) projects changed the perception of government agencies and society around the role and impacts of forests.
- growth in forestry production value reached an average of 2.8%/year; forestry GDP accounted for about 1% of the national GDP (if both direct (e.g. timber) and indirect (e.g. environmental services) benefits were included in this calculation, GDP reached 3–5%);
- Furniture exports reached USD 3.2 billion in 2010, meeting the strategy's target.
- Forest cover increased from 37% in 2005 to 39.5% in 2010, but did not meet the strategy's target.
- Timber production increased from 3.2 million m^3 in 2006 to 4.95 million m^3 in 2010, of which plantation timber accounted for 92%.
- The poverty rate decreased during 2006–2009 in the forest-rich provinces; from 2004 to 2008, in the Northern Midlands and Mountains, the rate decreased from 38.35 to 31.6%; in the North Central and Central Coast regions it decreased from 25.9% to 18.4%; while in the Central Highlands it decreased from 33.1% to 24.1%.
- Various technical advances, especially regarding tree species, have been applied in production, contributing to an increased productivity and quality of planted forests, in some places reaching 15–20 m^3/ha/year.
- Many breakthrough policies were issued: Decision 147/2007/QD-TTg on PDF development brought PDF area to 838,830 ha, equaling 112% of the target; Decision 380/2007/QD-TTg on piloting, and then Decree 99/2010/ND-CP on PFES policy made Vietnam the first country in Southeast Asia to implement PFES; Decree 117/2010/ND-CP on organization of SUF management was also key.

Because the forestry sector focused on implementing the 5 million ha reforestation project, review and assessment of the 2006–2010 period is mainly based on the objectives, tasks, policies and implementation of the 5 million ha reforestation project (Decision 661/QD-TTg dated 29 July 1998) and Resolution No. 73/2006/QH dated 29 November 2006 of the National Assembly, adjusting the targets and tasks of the 5 million ha reforestation project during 2006–2020 (GoV 2011, see also Box 1).

According to Pham et al. (2012), during 2006–2009, the increase in Vietnam's forest area was mainly due to: an increase in planted forests; the government carrying out a national forest land reform; the application of new technology; market opportunities for forest products; and increased agricultural output. The increase is also due in part to the new classification of 'forest'; this includes 'neglected forest', as it appeared in the previous forest classification, and 'regenerated natural forest area', which is mainly bamboo forest.

Box 1. Results of 5 million ha reforestation project during 2006–2010

- 1,140,630 ha reforested, achieving 114% of the target
- 922,768 ha zoned for natural regeneration, achieving 115% of the target
- 1,351,019 ha forest management (achieving 95% of the target)
- 2,507,355 ha contracted for forest protection (achieving 167% of the target)
- Forest coverage in 2010 was 39.5%, an increase of 2.4% compared to 2005
- Total timber stock in 2010 was 935.3 million m3, an increase of 15% compared to 2005
- 5 million m3 was logged from plantation forest in 2010
- Contributions to job creation and poverty reduction
- Because forest plantation increased and more forests are planted

Sources: GoV 2011; VNFOREST 2020a

MARD and FSSP (2010) also pointed out certain shortcomings in the forestry sector:

- Forestry sector growth is unsustainably low, with little profitability, weak competitiveness, and untapped forest potential, especially in terms of large-diameter timber, non-timber forest products (NTFPs) and forest environmental services (FES).
- Plantation forests with low productivity and quality have failed to meet demand in terms of large-diameter timber for processing and export.
- Wood and NTFP processing industries are developing fast but they are spontaneous and unstable, marked by a lack of planning and strategic vision. There is low competition (which exists mainly in processing), combined with a lack of supporting industries, established branding and investment to modernize the industry; wood sources are also mainly imported.
- The impact of the sector on poverty reduction remains very limited.
- The impact of forests on the environment is limited; the role and function of natural forests in environment protection and biodiversity conservation is limited.
- The overarching problem in the sector is a lack of capital for all three types of forests; The budget for forestry remains low and is not comparable to that received by other sectors.

Natural forest area continued to decrease during this period, and mangroves were also severely degraded (Pham et al. 2012). Although afforestation resulted in an increase in the forested area, data shows that most of this area was covered with plantations, while the remaining natural forest was in a poor state or under restoration. The main trend is still to develop and manage fragmented forests, and therefore a lot of forest was degraded during this period. Poor natural forests with timber volumes of less than 80 m^3/ha accounted for more than 80% of the total forest area during 2006–2020 (Pham et al. 2012).

The reports of the GoV (2011) and VNFOREST (2010) also highlighted that the main achievements and results of this period were due to: the significant determination of the Party and State, approved by the National Assembly; active application of market mechanisms; attention being paid to the socio-economic interests of people living near forests; importance being attached to planning and implementation of plans; the promotion of forest land allocation and long-term land-use rights for organizations, households and individuals; the completion of policies to encourage various economic sectors to invest in afforestation; the strengthening of state management; decentralization of local project implementation; the application of science and technology on different tree species and varieties; and the application of intensive farming techniques to improve project efficiency.

MARD and FSSP (2010) also give many recommendations for the next period to address existing challenges, including: gradually replacing imported wood; improving the quality of Natural Forests and Plantation Forests; completing investment policies for PTF and SUF; supporting plantation forest for timber production; varieties

and afforestation of large-diameter timber; supporting three forest types towards sustainable management through certification, prioritizing production forest; forest land-use planning; establishing a stable national forest estate; promoting implementation of PFES; building forestry corporations for large-diameter timber forestation; allocating forest land to mountainous households lacking agricultural land; innovating wood processing technologies to achieve high added value; and adopting policies to support technology innovation, including in supporting industries. MARD and FSSP (2010) also emphasized the need to: improve sector monitoring indicators and collect data; develop progress reports for the strategy; and increase the participation of stakeholders in the development, implementation and monitoring of policy.

3.2 Implementation during 2011–2015

In this phase, the Forest Protection and Development Plan (FPDP) for 2011–2020 was implemented (according to Decision No. 57/QD-TTg dated 9 January 2012 of the PM approving the FPDP for 2011–2020). At central level, a FPDP State Steering Committee and Office were established; a provincial-level Steering Committee was also established for FPDP Report 2006–2010' was the first progress report to evaluate the results of VFDS 2006–2020 implementation; this was followed by a second report in 2015 and a third in 2020 (Le 2010). From 2010 onwards, however, monitoring of forestry sector activities against the established targets did not happen systematically. As such, information and data that can be used to evaluate the previous strategy's implementation are scattered and unsystematic, so it is difficult to evaluate the effectiveness of VFDS 2006–2020.

However, in 2011, VNFOREST compiled and published the book 'Vietnam Forestry in the first decade of the 21st century' which recorded some of this period's achievements, including: the restoration and development of forest resources; the revision, supplementation and improvement of forestry legal systems and policies; and an increase in international cooperation in forestry. This book also highlights five main challenges the forestry sector faced over this period. These include: i) development challenges, like lack of capital, land disputes, weak management of enterprises, especially state forestry enterprises, weak market, and poor quality human resources and infrastructure; ii) poor quality forest resources, low production capacity and an undeveloped rural economy; iii) a lack of public awareness around the requirements of sustainable forestry development; iv) mechanisms and policies not yet in place to advance livelihood improvements for forest workers; v) root causes underlying forestry development challenges not having been fully identified and analyzed.

In 2011, MARD (2011) also stated that to develop the forestry sector well during 2016–2020, it would be necessary to: (i) have proper awareness of SFM; ii) absorb and appropriately apply the global forest management trends; iii) develop private and cooperative economies, and diversify the economic sectors involved in forestry; iv) promote science and technology research, and rapidly transfer new technology into production; and v) clearly define the role of the state in terms of forest management interventions. A number of advantages and opportunities were also predicted to have positive future impacts on forestry in Vietnam: i) an increase in internal resources; ii) improvements to the structure of the forest industry; the increase in planted production forests; developments to the wood processing industry; and a promising outlook for PFES; iii) forestry-related professions have had positive impacts in the economic development of households, contributing to poverty reduction among mountainous people; iv) forestry was recognized by society as contributing to overall country development.

According to MARD's report (2011), the forestry sector was also predicted to face five new challenges during 2016–2020: i) many potential risks to sustainable development within forestry; ii) low quality forest development and forestry; iii) natural, economic and social conditions posing new difficulties like the deteriorating productivity of forest land, access difficulties, inefficient protection of natural forests, human resource difficulties; iv) emerging challenges in managing natural forests to meet conservation and economic requirements; and v) international aid grants being reduced. These challenges resulted in the forestry sector's primary objectives, tasks and solutions being readdressed in the Forest Protection and Development Plan for 2011–2020, under Decision No. 57/QD-TTg dated 9 January 2012 (MARD 2011).

During 2011–2015, results from the first five years of the FPDP for 2011–2020 were reviewed and evaluated in line with the Prime Minister's Decision No. 57/QD-TTg dated 9 January 2012. The Prime Minister then approved the Target Program for Sustainable Forestry Development (TPSFD) for 2016–2020 in Decision No. 886/QD-TTg dated 16 June 2017, replacing Decision No. 57, to comply with the national target mechanism under the National Assembly's Resolution No. 18/2011/NQ-QH13 (Nguyen 2019).

3.3 Implementation during 2016–2020

This phase saw implementation of the TPSFD for 2016–2020 (according to Decision No. 886/QD-TTg dated 16 June 2017 approving this program). This involved establishment of a State Steering Committee and Office on TPSFD (GoV 2019).

According to interviewed stakeholders, many forestry-related innovations took place during 2016–2020. Interviews with VNFOREST representatives indicated that TPSFD 2016–2020 (hereinafter referred to as Program 886) achieved some key results. In 2018, targets for planted forest area, forest cover, timber output, and export values for wood and forest products, were all met or exceeded. A comprehensive report and evaluation of this phase, with supporting data, are to be finalized by the end of 2020, however, so at the time of writing this report, there had been no evaluation.

4 Results of implementing VFDS during 2006–2020

The VFDS sets out clear economic, social and environmental goals. In the following sections, we present associated implementation achievements and difficulties during 2006–2020.

4.1 Economic indicators

Table 1 shows the 15 economic indicators with targets established in VFDS 2006–2020. Of these, by 2020 five targets had been achieved or exceeded; three indicators had met adjusted targets; and seven did not reach the set targets.

Of the seven indicators where targets were not achieved as the strategy set out, we still see significant developments; for example, the PFES program, although not achieving its target of USD 2 billion/year, is considered as one of the ten most outstanding achievements of the Agriculture and Rural Development sector. Likewise, despite the newly-afforested area target not being reached, planted forests have developed strongly and are better meeting the raw material demand of the processing industry. Based on current progress, although the original target has not yet been reached, the ability to achieve it in the coming years is very feasible. That said, setting targets too high means results are difficult to achieve. The target of 200 million trees/year for planting scattered trees is unfeasible; while a target of 30% of production forests to be certified for SFM is difficult to achieve because certification is a complicated procedure and forest owners' capacity is limited; just as a 2–3% contribution of forestry GDP to national GDP is impossible based on current calculations.

According to a VNFOREST summary, there are seven factors behind the forestry sector's economic achievements during 2006–2020: i) the reform of forestry laws, mechanisms and policies; ii) successful implementation of forestry development programs like the 5 million ha reforestation project, the Forest Sector Restructuring Scheme, the FPDP for 2011–2020 and the TPSFD for 2016–2020; iii) the PFES policy; iv) successful mobilization and use of funds for forestry; v) scientific research and development of forestry technology; vi) forest human resource training and development; and vii) active international cooperation (VNFOREST 2020a).

Various reports and experts have explained why targets were not met for certain indicators (Table 2).

VFDS 2006–2020 does not set quantitative targets for forest ecological regions, so the assessment of results by region is limited. However, Table 3 provides a general picture of performance by ecological region in terms of the development of the forest product processing industry.

4.2 Environmental indicators

The forestry strategy sets out four environmental indicators. Table 4 shows that all four environmental indicators had been achieved by 2020 under their adjusted targets; however, compared to the original strategic goals, only one target has been achieved – the area for protection and special-use forest plantation. It is worth noting that the forest cover target was only achieved after a second adjustment; failure to achieve the original forest cover goal (47%) was primarily due to the fact that this target was too ambitious thus unfeasible; the area equivalent of 47% forest coverage is 15.55 million ha; equal to 95.7% of the 16.24 million hectares that Vietnam allocated to the forestry sector, including riversides, lakesides, mountains and around traffic infrastructure.[1]

1 According to Resolution No. 134/2016/QH13 dated 9 April 2016 on the adjustment of land-use planning until 2020 and the land-use plan 2016–2020, the total natural area planned for forestry was 16.245 million ha.

Table 1. Economic targets and implementation results

No	Objectives	2006	VFDS target (Dec 18)	Adjusted target	Implementation results 2020	Evaluation	
						Compared with VFDS target	Compared with adjusted target
1	Growth rate of forestry production (%/year)	1.9	3.5–4.0	5.5–6.0[1]	4.87	Achieved	Achieved
2	Rate of forestry GDP/national GDP (%)	<1	2–3		0.65	Not achieved	Not achieved
3	Establishing, managing, protecting, developing and sustainably using three types of forests (ha)	12,529	16,240[2]	14,400[3]	14,609	Not achieved	Achieved
4	Production forest area with SFM certification		30%	0.1 million ha/year[4]	269,163 ha	Not achieved [5]	Not achieved
5	Afforestation (million ha)		1.5	0.125[6]	1.233	Not achieved [7]	98.6% achieved
6	Reforestation after harvesting (million ha/year)	0.184	0.3	0.135[8]	0.235	Not achieved [9]	Achieved
7	Zoning for natural regeneration (million ha/year)		0.8	0.36[10]	0.34	Not achieved [11]	Not achieved
8	Scattered tree planting (million trees/ year)	202.5	200	50[12 13]	63	Not achieved [14]	Achieved
9	Domestic wood production (million m3/year)	3.01	20–24		20.5	Achieved [15]	Achieved
9a	Domestic large-diameter timber logging (million m3)		10		3–4	Not achieved	Not achieved
10	Firewood for rural areas (million m3/year)	26.07	25–26		19.5	Not achieved	Not achieved
11	Export of forest products (billion USD)	2.17	7.8	8.0–8.5[16]	12.0	Reached[17]	Reached
11a	Export of wood products (billion USD)	1.94	7.0		11.3	Reached [18]	Reached
11b	Export of non-timber forest products (billion USD)	0.23	0.8		0.9	Reached	Reached
12	Revenue from FES (billion USD)		2.0		0.728	Not achieved	Not achieved

1 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020
2 Resolution No. 134/2016/QH13
3 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020
4 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020.
5 Report of VNFOREST; VP 886
6 Decision No. 57/QD-TTg dated 9 January 2012 of the Prime Minister approving the FPDP for 2011–2020, and therefore new tree planting of 0.125 million ha/year, of which PDF make up 0.1 million ha, and PTF and SUF make up 0.025 million ha/year.
7 According to the Decision of MARD announcing forest status.
8 Decision No. 57/QD-TTg dated 9 January 2012 of the Prime Minister approving the FPDP for 2011–2020, and therefore afforestation of 0.125 million ha/year, of which PDF make up 0.1 million ha, and PTF and SUF make up 0.025 million ha/year.
9 According to the Decision of MARD announcing forest status.
10 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020.
11 According to VNFOREST the average area of natural regeneration during 2006–2010 was 0.64 million ha/year; during 2011–2015 it was 0.36 million ha/year and during 2016–2019 it was 0.315 million ha/year.
12 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020.
12 Resolution 134/2016/QH13
13 Decision No. 57/QD-TTg dated 9 January 2012 of the Prime Minister approving the FPDP for 2011–2020, and therefore new tree planting of 0.125 million ha/year, of which PDF make up 0.1 million ha, and PTF and SUF make up 0.025 million ha/year.
14 Report from VNFOREST and the Program 886 office.
15 According to the Decision of MARD announcing forest status.
16 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020
17 Statistics and reports from VNFOREST.
18 Statistics and reports from VNFOREST.

Source: Authors compiled, from VNFOREST 2020 data

Table 2. Reasons for not achieving the targets set out in the strategy

Indicators where established targets were not met	Reasons targets were not met
Rate of forestry GDP/national GDP (%)	• Forestry's contribution to GDP is low because the calculation method used includes only the direct contribution of forest creation and logging activities, but excludes forest environmental services and wood processing (Decision 38/2010/QD-TTg of the Prime Minister, dated 15 November 2010). • If calculating the spread value to other economic sectors according to the analysis method used in the 2016 interdisciplinary input-output (I-O) balance sheet, the total contribution of four forestry sub-sectors, including afforestation and forest care, logging, exploitation of other forest products, and forest environmental services, is 2.3% of national GDP; whereas the full contribution of the forestry sector, including wood processing, paper and related products, printing and furniture industries, adds 5.88% to the gross value added (GVA) of the economy.
Establishing, managing, protecting, developing and sustainably using three types of forests	• From 2010 to 2017, the area of forest protected for biodiversity conservation or SUF increased; while the area of PTF decreased in 2016 (Pham et al. 2020b) • Although total community-managed forest area in 2017 has doubled compared to 2005, community and household-managed forest area is still much lower than the original government plan which intended to hand over areas being managed by inefficient state companies to households and communities. A large area of forest land has been acquired from state forestry companies, but this has not yet been transferred to communities (Pham et al. 2020b).
Production forest area with sustainable forest management (SFM) certification	• In 2009, Vietnam had just one SFM certification issued by FSC for 9,904 ha of plantation, but about 170 certificates were issued for chain of custody. Such a small area is mainly due to the scarcity and high cost of certified timber products (Pham et al. 2012). By 2016, just 220,000 ha had been certified, equivalent to 5.3% of the total planted forest area (Pham et al. 2020b). • Vietnam has now developed a Code of Conduct for SFM in Vietnam including 10 principles, 56 criteria and 207 indicators, and a set of national standards for SFM and forest certification in Vietnam under the Programme for the Endorsement of Forest Certification (PEFC). In terms of certified forest area, by 2 November 2017, Vietnam had 29 units granted forest certificates with a total area of 218,065 ha. Looking at the target set out in VFDS 2006–2020, that by 2020 30% of production forest area must be SFM certified, just 3.3% of this target has been achieved. Based on current progress, it is very difficult for the country to achieve the proposed target of 30% by 2020 (Tran DN 2020). • According to our interviews with experts, the failure to achieve the forest certification target is due to unclear land-use rights, high appraisal costs, difficulties for people and businesses in accessing capital, and the fact that prices and markets are not stable and secure.
Afforestation (million ha) Reforestation after harvesting (million ha/year)	Although the strategy aimed to reduce dependence on international timber imports (from 80% to 20% by 2020), by expanding planted forest area; developing forests and inland protected areas to replace imports; certifying 30% of the national production forest; and upgrading the export processing industry, according to Pham et al. (2012) this is a very difficult target to achieve for the following reasons: • The maintenance and/or expansion of forest cover requires consistent land-use planning; unplanned conversion of land for other purposes (e.g. for agricultural and infrastructure development) means this goal is difficult to achieve. • The domestic wood processing industry is hampered by competition from the wood chip industry, high transportation costs for transferring wood from forests to factories, bureaucratic and inefficient management, fragmented land, and management by multiple small households. • Cooperation and linkages between enterprises are limited, just as credit support and investment policies are lacking. Domestic production requires a large volume of imported wood, and the need for legally-binding imported wood on the market is increasing. • Existing plantation forests are only capable of supplying small-diameter timber, so they only serve the wood chip processing industry, while the furniture industry requires large-diameter timber. • Afforestation is generally not seen as a viable business, mainly because understanding of timber and forest products and how to generate revenue and benefit from afforestation is limited. In addition, the supply of wood for the pulp and paper industry is greater than the demand, leading to lower prices for these products. • Currently, forestry agencies and private enterprises are the only two groups investing in afforestation. The more middlemen involved in the timber trade, the more transaction costs are pushed up and parties are forced to accept low prices; profit then becomes negligible, making capital accumulation to continue reforestation unfeasible.

Continued on next page

Table 2. Continued

Indicators where established targets were not met	Reasons targets were not met
Zoning for natural regeneration (million ha/year)	According to interviewed parties, the failure to reach the 'increased area for natural forest regeneration' target is for various reasons: • Low per hectare cost norms for forest protection. Due to budget limitations, forest regeneration activities focus mainly on protection and special-use forests; there has been insufficient support for production forest areas. • It is difficult to get people on board with reforestation zoning, especially in ethnic minority areas that have a tradition of upland rice cultivation. People do not want to regenerate forests on the swidden land they are cultivating, because shifting cultivation has a higher income value and forms a key part of the culture for many ethnic groups. • Although central government provides funding for forest regeneration, in practice, many provinces do not have a counterpart funding source to which they can allocate bureaucratic and management costs, so that they can implement forest regeneration. • The capacity of local officials is often limited, so they often have to hire consultants to prepare contracting documents. However, due to low payment rates and limited financial resources, it is often difficult to find consultants that perform their duties in a timely manner. • Zoning for natural forest regeneration is mainly concentrated in terrestrial forests, however limited areas of poor quality mangrove forest are also being regenerated.
Scattered tree planting (million trees/year)	According to our interviews with experts, in many localities across the country, scattered planting has been widely propagated, and many activities have been carried out. Despite this, the scattered planting target hasn't been achieved. This is because allocated funding was insufficient to meet the real need, the quality of seedlings is not guaranteed and the planning of this activity was not suitable.
Domestic large-diameter timber logging (million m^3)	According to interviewees, the target for large-diameter timber output has not been achieved due to the following reasons: • Many localities have not been active in directing the intensive planting and transformation of large-diameter timber plantations. • Many localities have not been able to balance their budgets so that they can promptly support people to participate in large-diameter timber forest planting. Even in the provinces that have funding, people in areas with extreme weather and high levels of storms do not want to participate and move into the large-diameter timber plantation model due to the high risks involved. • There is a lack of basic scientific research and data collection around fast-growing, high yield and high quality species that have large biomass production, and that are suitable for specific ecological regions. • There is a lack of effective livelihood models that help people to ensure their livelihoods when involved in a large-diameter timber production cycle, which is often long.
Firewood for rural areas (million m^3/year).	Currently, there is no report or analysis that specifically analyzes the rural firewood target, and why this has not been achieved. It is worth noting, however, that at the time of developing VFDS 2006–2020, firewood was identified as the main cause of deforestation and forest degradation, because people mainly used firewood for cooking and energy purposes. Recent social developments have meant that rural people have changed their fuel use in the kitchen to gas stoves, biogas and improved stoves, so the demand and use of firewood has decreased sharply.
Revenue from forest environmental services (FES) (billion USD) *Not including direct payments and leasing FES*	• The concept of forest 'price' has been based on the value of forest-use rights. According to current regulations, forest pricet is a narrow concept and includes only direct benefits from the use of forest products. The value of forest environmental services is not included in the forest 'price', as the concept of 'forest price' hasn't been approached from the perspective of the total economic value of the forest. In addition, the implementation and monitoring of forest valuation has not been given due attention at either central or local level. • It is also challenging to apply the forest price brackets set by the province, as: (1) issued price brackets do not represent the value of the forests at the time of promulgation – government document issuance is usually one to two years behind the proposed price bracket report; (2) agencies apply forest prices based on the price norms set by the Department of Finance which do not reflect the wider market; (3) local capacity to undertake forest pricing is limited; and (4) forest price brackets are mainly established by state management agencies, so forest prices may not reflect market rules properly. The report also suggests that integrating pricing for FES into forestry policy should be based on four main principles: (i) environmental services need to be assessed through a multi-purpose perspective, looking at both timber and non-timber value, and the contribution of forests and the forestry sector to green growth; (ii) valuation of FES needs to be embedded in forestry policies to encourage the use of forests for multiple purposes; forest owners should also be encouraged to provide and secure use of forests for multiple purposes, or even compensated for doing so; (iii) the pricing of forest environmental services should be based on both a scientifically calculated methodology and public consultation on the role and impact of the environmental services on current and future land use and local livelihoods; (iv) environmental services should be 'bundled' together, rather than taking a focus on specific individual environmental services (Pham et al. 2017; Phuong et al. 2017).

Table 3. Forest product processing industry development: Implementation results by ecological region

Ecological region	Objective	Results				
		Number of wood processing enterprises	By economic sector	By scale	By product	Average growth rate 2015–2018
Northern Midlands and Mountains		718 enterprises (7.04% of all wood-processing enterprises in Vietnam)	1 state-owned enterprise 705 non-state enterprises 12 foreign direct investment (FDI) enterprises	11 large enterprises 363 small and medium enterprises 344 micro-enterprises	356 companies producing artificial boards and construction wood 280 companies processing natural wood 82 companies producing furniture (beds, wardrobes, tables and chairs)	3.76 %/year
North Delta region	To develop wood processing industries and NTFPs, and traditional craft villages	2,987 enterprises (27.24%)	1 state-owned enterprise 2,942 non-state enterprises 44 FDI enterprises	43 large enterprises 1,604 small and medium enterprises 1,340 micro-enterprises	1,418 companies producing artificial boards and construction wood 312 companies processing natural wood 1,257 companies producing furniture (beds, wardrobes, tables and chairs)	7.85 %/year
North Central Region and South-Central Coast	To develop the forest product processing industry	1,891 enterprises (17.6%)	3 state-owned enterprises 1,856 non-state enterprises 32 FDI enterprises	85 large enterprises 862 small and medium enterprises 944 micro-enterprises	626 companies producing artificial boards, construction wood 1891 companies processing natural wood 615 companies producing furniture (beds, wardrobes, tables and chairs)	6.26 %/year
Central Highlands	To develop the forest product processing industry	331 enterprises (3.23%)	2 state-owned enterprises 329 non-state enterprises	6 large enterprises 113 small and medium enterprises 212 micro-enterprises	125 companies producing artificial boards and construction wood 331 companies processing natural wood 80 companies producing furniture (beds, wardrobes, tables and chairs)	5%/year
Southeast region	To develop forest product processing industries and export	4,861 enterprises (40.21%)	9 state-owned enterprises 4,456 non-state enterprises 396 FDI enterprises	391 large enterprises 2,420 small and medium enterprises 2,050 micro-enterprises	475 companies producing artificial boards and construction wood 3,991 companies processing natural wood 1,180 companies producing furniture (beds, wardrobes, tables and chairs)	12.28 %/ year
Mekong River Delta Region		543 enterprises (4.67%)	1 state-owned enterprise 520 non-state enterprises 22 FDI enterprises	20 large enterprises 243 small and medium enterprises 289 micro-enterprises	82 companies producing artificial boards and construction wood 543 companies processing natural wood 211 companies producing furniture (beds, wardrobes, tables and chairs)	10.46 %/ year

Source: Green Anamite project 2020

Table 4. Implementation results in relation to environmental indicators

No.	Objective	2006	VFDS target (Dec '18)	Adjusted target	Implementation results 2020	Evaluation	
						Compared with VFDS target	Compared with adjusted target
1	Management, protection and development of three types of forests (million ha)	12.5	16.24	14.4[1]	14.6[2]	not achieved	achieved
2	Forest coverage (%)	37.7	47	42[3] 44–45[4]	42	not achieved	achieved
3	Planting of protection and special-use forests (million ha)		0.25	0.075 (2016–2020)[5]	0.694[6]	achieved	achieved
4	Minimize violations of the law on forest protection and development (%)	38.534	Reduce by 80%	Reduce by 30–35% by 2011–2015[7]	10.731	not achieved	achieved

1 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020
2 Decision to announce national forest status in 2019
3 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020
4 Decision No. 57/QD-TTg dated 9 January 2012 of the Prime Minister approving the FPDP for 2011–2020, and therefore afforestation of 0.125 million ha/year, of which PDF make up 0.1 million ha, and PTF and SUF make up 0.025 million ha/year.
5 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020.
6 By 2010, Vietnam had planted 79,810 ha of SUF and by 2019 the planted SUF area was 86,570 ha. Planted PTF area in 2010 was 614,265 ha and in 2019 was 692,730 ha. Thus, the total planted area of SUF and PTF by 2010 was 779,300 ha and by 2019 was 694,075 ha, exceeding the strategy's target.
7 Decision No. 886/QD-TTg dated 16 June 2017 approving the Target Program for Sustainable Forestry Development for 2016–2020.

Source: Authors compiled, using data from VNFOREST 2020

Implementation of the VFDS 2006–2020 goals also took place through directing the development of forest coverage and forest area in each ecological region (Table 5). The results in Table 5 show that between 2006 and 2019, four indicators – forest area, planted forest area, natural forest and forest cover – saw positive growth in the Northwest and North-East regions, North Central and South Central Coast, but negative growth in the Central Highlands, North Delta and Mekong River Delta. In the Northern Delta and Mekong River Delta, the reduction in forest cover was mainly due to the conversion of forest land to other purposes for socio-economic development. In the Central Highlands, changes in forest use, land disputes and violation of regulations on forestland management are complicated; it is difficult for afforestation to compete in economic efficiency compared to other crops. This shows the need to have specific policy changes to make forest management and protection more effective in this key region.

4.3 Social indicators

VFDS 2006–2020 sets out four social goals, but only in one of these – job creation – were targets met or exceeded; the remaining three goals were not met, even when targets were adjusted (Table 6).

There are many reasons why the targets for hunger eradication and poverty reduction were unfeasible. However, according to Pham et al. (2010), one of the main reasons is that although there are many state programs to support the poor, not all poor households have the financial and human resources to participate. Ineffective and inequitable implementation of the benefit-sharing mechanisms of these programs also results in people not having access to adequate information and support from forest protection projects and programs (Pham et al 2011; Pham et al. 2019c). In addition, the poor often have little access to the market; while the need for labor is increasing, technologies are increasingly advanced and industrial means of processing are increasingly concentrated. Access to information on state policy programs by the poor is also limited, due to ineffective communication

Table 5. Implementation results in terms of area and rate of forest cover, by ecological region (2006–2019)

Ecological regions		Indicators	2006	2019	2006–2019
Northern Midlands and Mountains	North West	Forest area (ha)	1,508,740	1,757,428	248,688
		Plantation forest (ha)	109,573	195,379	85,806
		Natural forest (ha)	1,399,167	1,562,049	162,882
		Forest cover (%)	40.33	45.52	5.19
	North East	Forest area (ha)	3,164,871	3,925,225	760,354
		Plantation forest (ha)	893,874	1,560,149	666,275
		Natural forest (ha)	2,270,997	2,365,076	94,079
		Forest cover (%)	47.93	56.28	8.35
North Delta region		Forest area (ha)	95,836	82,775	-13,061
Plantation forest (ha)		48,520	36,676	11,844	
		Natural forest (ha)	47,316	46,099	1,217
		Forest cover (%)	8.18	6.04	*-2.14*
North Central Region and South-Central Coast	North Central Region	Forest area (ha)	2,611,526	3,116,921	505,395
		Plantation forest (ha)	534,584	900,466	365,882
		Natural forest (ha)	2,076,942	2,216,455	139,513
		Forest cover (%)	50.73	57.76	7.03
	South Central Coast Region	Forest area (ha)	1,775,779	2,436,689	660,919[1]
		Plantation forest (ha)	330,914	862,189	531,275
		Natural forest (ha)	1,444,856	1,574,500	129,644
		Forest cover (%)	40.57	50.35	9.78
The Central Highlands		Forest area (ha)	2,976,950	2,559,956	*-416,994*
		Plantation forest (ha)	152,115	368,734	216,619
		Natural forest (ha)	2,824,835	2,191,222	*-633,613*
		Forest cover (%)	54.66	45.92	*-8.74*[2]
Southeast region		Forest area (ha)	431,137	480,892	49,755
		Plantation forest (ha)	144,942	223,735	78,793
		Natural forest (ha)	286,195	257,157	*-29,038*
		Forest cover (%)	18.23	19.37	1.14
Mekong River Delta Region		Forest area (ha)	309,307	249,335	*-59,702*
		Plantation forest (ha)	248,992	169,459	*-79,533*
		Natural forest (ha)	60,045	79,876	19,831
		Forest cover (%)	8.25	5.4	-2.85

1 This is the region with the largest increase in forest area in the past 15 years: planted forest increased 2.55 times more than natural forest.
2 The biggest reduction in the country

Source: Authors compiled using VNFOREST data (2020)

and information connections among the parties (Moeliono et al. 2016).

For the 'Forest and forest land allocation' program, the reasons the established targets were not met are also summarized and explained in the reports of Pham et al. (2012) and Pham et al. (2016a) (see also Box 2).

When explaining why the goal for forestry-related training had not been reached, interviewees said that although forestry universities and colleges were innovative in many ways, they found it challenging to recruit students for the forestry sector, as they were competing with other sectors' training programs. The forestry curriculum also required updating to match current realities.

Table 6. Social goals and implementation results

No.	Objectives	2006	VFDS target (Dec 18)	Adjusted target	Implementation results 2020	Evaluation	
						Compared with VFDS target	Compared with adjusted target
1	Create jobs		1.5 million jobs		5 million	Achieved	Achieved
2	Increase income, contribute to hunger eradication and reduce the number of poor households in key forestry areas		70%		31.1–60.8%	Not achieved[1]	Not achieved
3	Allocation and lease of forests and forest land		Intended to be completed by 2010		11.6 million ha	Not achieved[2]	Not achieved
4	Rate of forestry workers in training (%)	10.6	50		8.54	Not achieved[3]	Not achieved

1 According to the General Statistics Office, in three key forestry areas, the percentage of poor households in the Northern Midlands and Mountains in 2006 was 27.5%; in 2019, this was 18.4% - a reduction of 33.1% ; in the North Central region the rate reduced from 22.2% to 8.7%, down 60.8%; while in the Central Highlands the rate reduced from 24% to 13.9%, a reduction of 42.1%.

2 According to VNFOREST data until 2019 reached 11.6 million ha, equaling 79.5% of the total forest area and 70.8% of forest land

3 According to the General Statistics Office, in 2006 the percentage of trained workers in the forestry sector (including those without certificates) was 10.63%; in 2011 this was 8.38% and in 2016 it was 8.54%. In 2019, the number of trained workers in Agriculture, Forestry and Fisheries in 2019 was 4%.

Source: Authors compiled, using data from VNFOREST 2020

Pham et al. (2012) also highlighted that the forestry-related training programs do not meet the practical needs of local markets and different localities. Discussing the challenges of securing human resources, Tran TTH (2020) also explains the difficulties:

- The number, capacity and qualifications of the managerial, scientific and technical staff of the sector have not matched the need, in terms of the market and international integration.
- There is a workforce imbalance between forest protection and development, reducing the effectiveness and efficiency of management, especially at district and commune levels.
- In terms of human resources for forestry businesses and production, there is currently a severe shortage of highly-skilled workers, in particular good engineers in the fields of forest product processing and high-quality seedling production; training qualifications are insufficient to meet market needs.
- Linkages are lacking between training, research and forestry extension (i.e. assistance and technical guidance for local people on how to plant and develop trees), and a lack of a mechanism that enables close cooperation among different groups of forestry actors; education, training and extension programs also do not perform well in terms of assessing training needs, so content and training methods are not meeting actual requirements.
- Investment is limited into capacity building and technical facilities for forestry training units, training quality has not been adequately improved, difficulties in recruitment and promotion mechanisms have failed to attract students to forestry-related universities and colleges. That traditional training disciplines have a very low number of learners is also down to the facilities, techniques and structure of the training programs and lectures, which do not meet the practical requirements, meaning graduates lack the necessary knowledge and skills for the profession.
- Particularly at local level, science and professional teams and production facilities are insufficient in quantity and, in many fields, still weak in quality and uncoordinated; scientific teams have not been formed in each specialized field, so their ability to attract funding and

Box 2. Main reasons behind the challenges of forest and forest land allocation in Vietnam

- Difficult terrain, lack of funds and limited personnel to carry out the necessary measurements to issue the Red Book (i.e. the land use right certificate).
- Old land maps and unclear boundaries between land types have led to a situation where many forest land certificates do not match the area being managed because the authorities use different data or measurement methods for different areas.
- Differences between traditional policy, legal and customary rules and poor enforcement of laws have hindered effective management. These issues are known to related parties but there is no appropriate solution.
- Forest land allocation does not guarantee the allocation of 'real power' – i.e. legal rights – and in practice it can create conditions of open access. Allocated forest land is often not fertile and, in the absence of technical and financial support from the government, is often abandoned. More worrying is the fact that land classified by the government as 'unused land' is actually under customary ownership but is not officially recognized by law. In many localities, some households do not want to receive forest land because the land is located far away from their home, making it difficult to manage, look after and protect. Under such circumstances, households can sublease to state forest enterprises (SFEs) and receive a small rent, which is sufficient to cover the land-use tax.
- Forest land allocation does not allow for co-ownership at the household and community level. This could limit women's rights and limit upland production systems that are jointly developed and co-owned between men and women.
- Provincial-level forest land-use plans changes often; this leads to households being unable to adjust their own plans to keep up with erratic changes at provincial level. As a result, land is abandoned or used for purposes other than those specified.
- Local people seldom consider commercial-scale harvesting as being to their advantage; they instead consider it to negatively affect their traditional pattern of resource management. Land allocation therefore does not seem to support poverty alleviation, as income from forest protection and reforestation rarely contributes to the incomes of the upland poor. Logging and state-owned enterprises often consider large trees to be their own property, rather than the property of people living in the forest or near forests.
- Under government Decree No. 01 and Decision 187, SFEs must hand over the forest land they control to third-party contractors (usually local households) to ensure its long-term use and protection; these third-party contractors are then able to benefit from key forest products. In practice, however, SFEs often contract third parties annually, rather than over a longer period. This situation leads to a low commitment to forest protection among the contracted households.
- The most fundamental problem is inequality, with land being allocated in practice primarily to 'mass' organizations (i.e. women's unions, farmers' associations), SFE staff and some individuals. As such, forest land has become the basis for capital accumulation, benefitting households with political power and social relations. Inequality also occurs between ethnic minority groups.
- On the other hand, forest land allocation has allowed non-state actors to become engaged in forest management. Recently, this has involved eight different actors – state companies (former state forest enterprises); protection forest management boards; special-use forest management boards, managing protected areas and national parks; village households and communities; Commune People's Committees; joint stock companies; mass organisations, and the defense force. However, state companies and management boards continue to manage over 50% of the country's forests. Local people have limited access to protection and production forests.
- Public sector entities control the highest quality forest areas, while non-state actors, especially local people, are allocated poor quality and degraded forests. This can lead to difficulties in mobilizing households to participate in forest protection.
- Land allocation in Vietnam is largely based on the country's ability to invest in land; that includes both human resources and capital. However, the majority of the poor, including ethnic minorities (of which most are dependent on forests), lack both labor and capital.
- In the mountainous Northern provinces, the reality of forest land allocation is extremely difficult because of poor database management systems and inaccuracies, inconsistency in data among state agencies, poor communication, limited resources and a lack of political commitment to forestland allocation in conflict areas.

conduct integrated, interdisciplinary research programs is still limited.

- Agro-forestry extension services are primarily dependent on state budget and technology, and take a 'top-down' approach; whereas non-state extension services are weak and have almost no private sector participation. This also stems from the fact that forestry involves material production, an industry with a long production cycle, which is therefore high risk and less attractive for investors. While agro-forestry extension services only focus on technology transfer to households, this does not really bring direct economic benefits to the people and private sector entities involved in production, development, market expansion and enhancing the value of forestry and agroforestry products.
- Managers, people and society at all levels do not recognizing the value and benefits that forests and forestry contribute to society, economy and the ecological environment. The lack of comprehensive scientific research programs, on forest resource pricing and the economic, social and environmental benefits of forest ecosystem services for example, is one of the main reasons for this. In addition, implementation of PFES and REDD+ has not, in practice, created a breakthrough source of finance so as to increase investment in forest protection and development in Vietnam.
- One ranger unit currently has to manage and protect a forest area two or three times bigger than that required by law, as there is lack of financial support to ensure a full-time forest protection workforce. That such positions involve heavy and dangerous work and low unstable income is one of the main reasons it is challenging to attract students to forestry training schools.

It is worth noting that gender equality has not been given adequate attention. Pham et al. (2012) and Pham et al. (2016b) indicate that women's participation in the forestry sector is very limited and there is no evidence of effective coordination and support from local authorities to women in communities. This group of authors also point out the challenges of mainstreaming gender in the absence of professional staff who can integrate gender issues into forestry activities, as well as the fact that women are rarely assigned to leadership positions. In addition, although forestry policy has made many commitments on gender equality, programs and projects do not have specific guidelines and monitoring systems to support this (Pham and Brockhaus 2015). Benefit-sharing mechanisms and information provision on forest protection projects and programs rarely take into account women's needs and accessibility (Pham and Brockhaus 2015).

5 Results of program implementation

As mentioned above, implementation of the strategy is organized into five programs. In the following section, we present the results achieved in each program.

5.1 'Sustainable forest management and development' program

The 'sustainable forest management and development' program is the backbone of VFDS 2006–2020. Table 7 shows that this program sets out nine main goals, but only two of these have met or exceeded their targets; two out of nine targets neither have data nor a monitoring system in place to enable evaluation, and the remaining five targets only partially achieve their anticipated targets. Reasons for not meeting these goals have already been discussed and presented in the section on environmental objectives, above. However, the lack of a monitoring and evaluation system for some indicators of forest quality is especially problematic; investment into building information systems infrastructure is required so that there can be an appropriate data management system in the future.

Between 2006 and 2019, the average area that was forested was 227,507 ha/year.

Table 7. 'Sustainable forest management and development' program: Objectives, targets and implementation results

No	Program objectives and targets	Implementation results
1	Establish a stable national forest estate with three forest types (protection forests, production forests and special-use forests).	From 2006 to 2020, the area structure of these three forest types has been relatively stable. See Figures 4, 5 and 6 below.
2	Implementation of sustainable forest management (SFM); production forest owners develop and implement an SFM scheme; at least 30% of production forest area is certified for SFM	• According to a VNFOREST report, by 2019, 266,974 ha in 24 localities were certified for SFM, of which 43,691 ha were certified in 11 provinces, with 15 forest owners. As total production forest area in 2019 was over 7.8 million ha, certified land made up just 3.4% of that total. • Although the total forest area certified for SFM reached 46% of the target set in the FPDP 2016–2020 (according to the SFDP 2020 implementation results and planning report), the goal to have 30% of production forest area SFM certified by 2020, as proposed by VFDS, cannot be achieved.
3	1 million ha of new forest to be planted by 2010 and 1.5 million ha to be planted in the next phase (2010–2020)	Concentrated afforestation achieved an average of 227,500 ha/year between 2006 and 2020. In 2019, there was over 4.3 million ha of planted forest area in Vietnam, exceeding the strategic target of 1 million ha by 2010 and 1.5 million ha by 2020. By 2019, newly-planted forest area (excluding replanting after exploitation) reached a total of 1.233 million ha – equal to 82.2% of the original strategic target and equal to 98.65% of the adjusted target set in Decision No. 57/QD –TTg. See also Table 8 and Figure 8 below.
4	Improve productivity of planted forests	The average productivity of planted forests in 2019 was about 15 m^3/ha/year, a 1.5 increase on productivity in 2009; intensive plantation of certified varieties (i.e. tree species that are certified to be highly productive) reached 20–25 m^3/ha/year. See Figure 7 below.

Continued on next page

Table 7. Continued

No	Program objectives and targets	Implementation results
5	Improve the quality of 0.5 million ha of poor quality natural forest	No data is available on forest quality.
6	Scatter planting of 200 million trees/year.	An average of 55 million trees were planted annually using a scattered planting approach; as such, the initial target was not met, but the adjusted target under Decision 886 was met.
7	Domestic wood production is stable; by 2010, it will reach 9.7 million m^3/year; by 2020, it will reach 20–24 million m^3/year (of which 10 million m^3 will be large-diameter timber); small-diameter timber supply for pulp processing by 2010 will be 3.4 million m^3; by 2020 this will be 8.3 million m^3.	Domestic timber production from planted forests has steadily increased, reaching 19.5 million m^3 in 2019. It was estimated to reach 20.5 million m^3 by 2020, thus achieving the strategic goal; however, only 4 million m^3 of the 10 million m^3 target for large-diameter timber was met (40%[1])
8	All forests and forestland will be allocated or leased to forest owners from all economic sectors before 2010; and the capacity of forest owners will be strengthened.	• The total area of forest allocated to owners is 11.6 million ha, accounting for 79.5% of the total forested land; not reaching the strategic goals. • 2.9 million ha of forest area is currently unallocated, with management temporarily assigned to the Commune People's Committee. This amounts to 20.5% of the total forested land area. • SUF and PTF – which together cover about 48% of the forestland area and represent most of the important terrestrial, marine and wetland ecosystems – are now assigned to management boards. • The area of production forest allocated to households and individuals is now 3 million ha (39% of all total forest area), while communities now manage 1.2 million ha (16%); forestry companies continue to manage 1.1 million hectares (14%); the remaining area of forest is managed by Commune People's Committees and other organizations. • See also Figure 6.
9	To invest in equipment to modernize forest management and undertake periodical forest inventories; consolidate and update the forest resource database.	No data is available on these objectives.

1 According to survey results from the localities, large-diameter timber accounts for about 20% of total plantation forest exploitation at present.

Source: Authors compiled using data from VNFOREST 2020

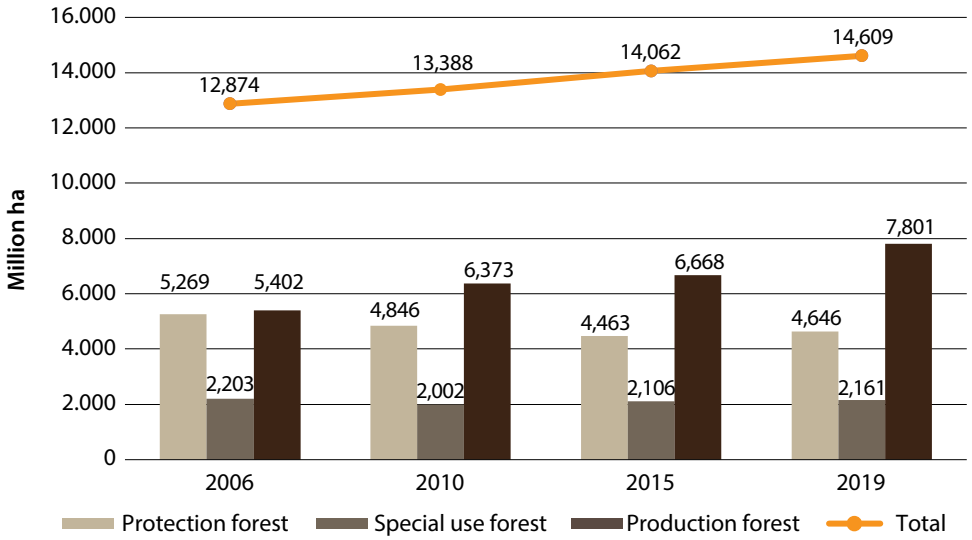


Figure 4. Changes in forest area across the three types of forest during 2006–2019

Source: Authors compiled using data from VNFOREST 2020

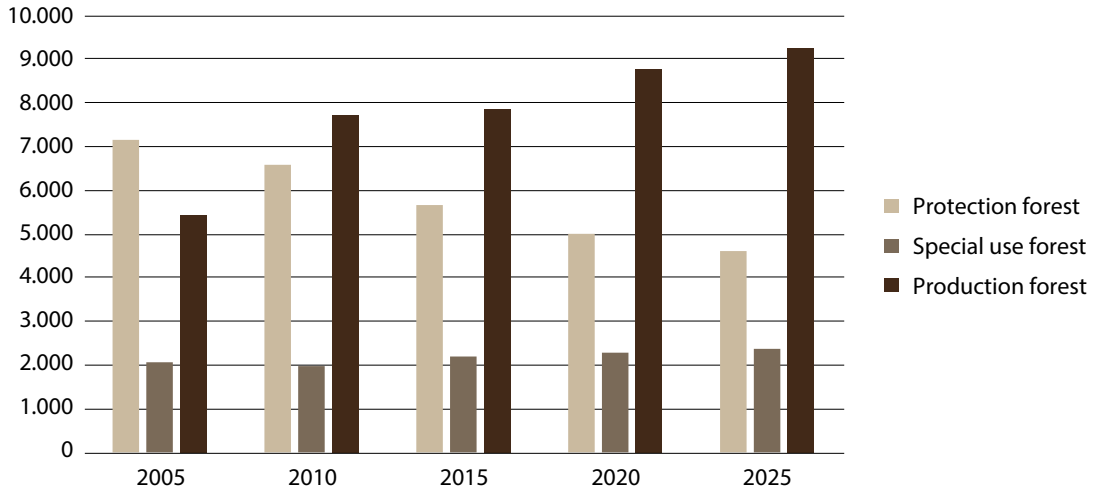


Figure 5. Forest land area during 2006–2020

Source: Vũ 2020

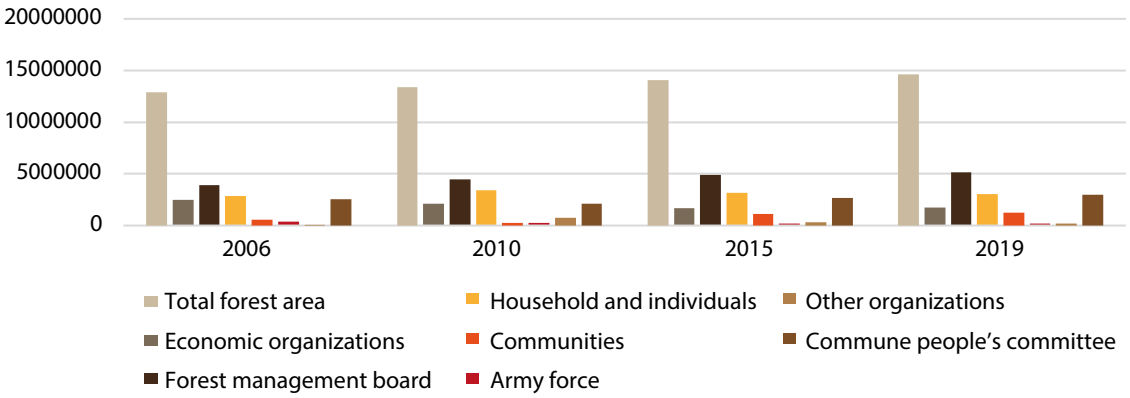


Figure 6. Forest area by owner during 2006–2019 (in ha)

Source: Authors compiled using data from VNFOREST 2020

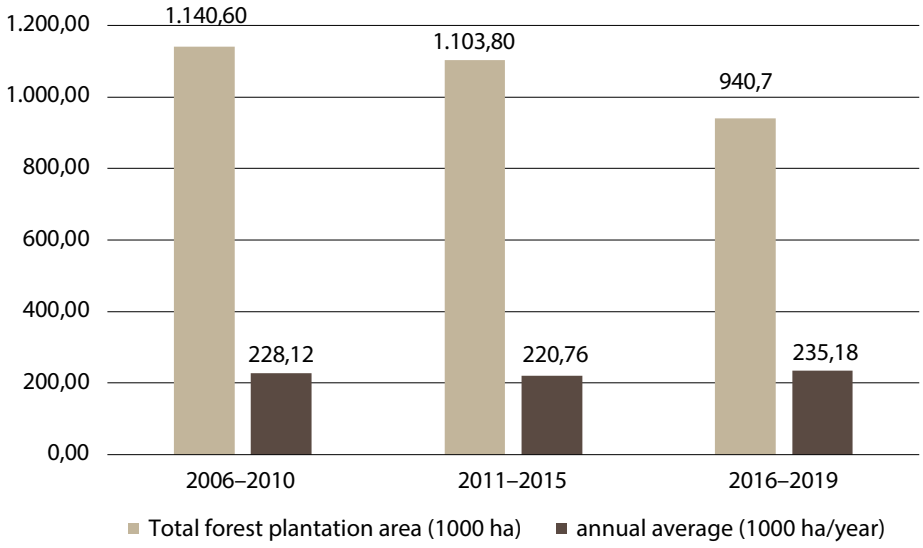


Figure 7. Concentrated afforestation during 2006–2019

Source: Authors compiled using data from VNFOREST 2020

Table 8. Ratio of planted forest (PT) to total forest area (TFA) during 2006–2019

Year	2006	2010	2015	2019
Ratio PT/TFA (%)	19.14	23.03	27.64	29.55
The percentage increase compared to the previous period (%)	-	25.0	26.0	31.5

Source: Authors compiled using data from VNFOREST 2020

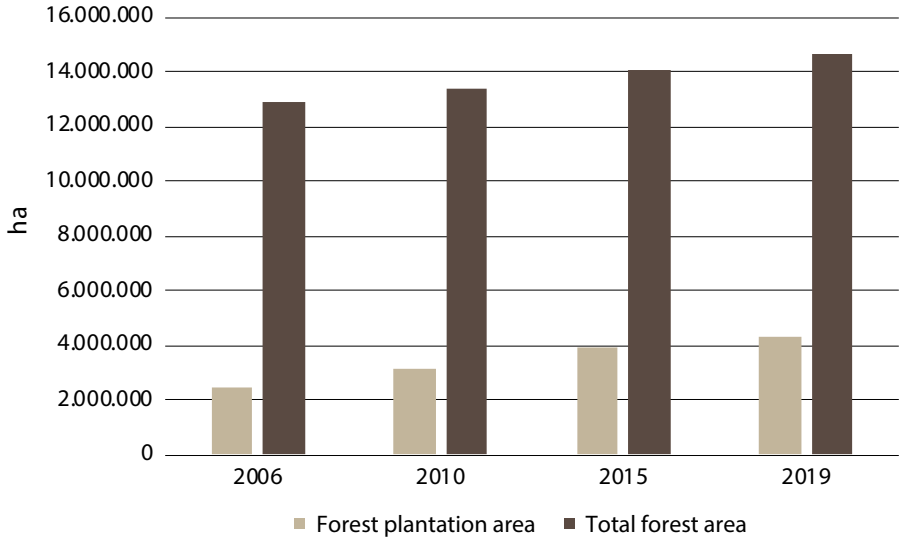


Figure 8. Development of plantation forest area 2006–2019

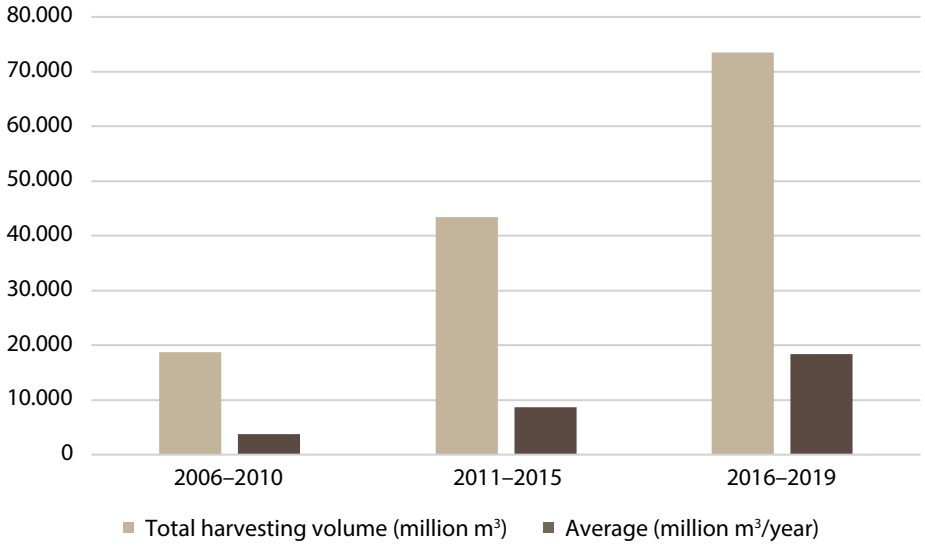


Figure 9. Timber production from planted forests 2006–2019

Source: Authors compiled, using data provided by VNFOREST 2020

5.2 'Protection, biodiversity conservation and development of forest environmental services' program

Table 9 shows that the program for protection, biodiversity conservation and environmental services development set out eight goals, but just one of these was achieved as the strategy originally intended. Many indicators lack clear and complete data to prove whether an associated target has been achieved or not.

Table 9. 'Protection, biodiversity conservation and development of forest environmental services' program: Objectives, targets and implementation results

Program objectives and targets	Implementation results
Effectively protect 16.24 million ha of forest and forestry land.	By 2019, the total forest area being managed and protected is 14.6 million ha, equal to 89.9% of the strategic target, but exceeding the 886-program target of 14.4 million ha.
Disseminate 100% of legal documents on forest protection to forest owners and local people.	There are no comprehensive statistics on this content. However, there are some reports of people without access to information concerning major policies like PFES (Yang et al. 2015; Le et al. 2016).
Reduce by 80% violations of the law on forest protection and development.	Number of violations decreased by 57.6%, not meeting the strategic target, but reaching the 886-program target (30–35%) (see also Table 10 below).
Increase investment in infrastructure, equipment, operating costs for forest protection, fire prevention, and pest control.	Fifty-eight out of 63 provinces/cities have established a steering committee on urgent issues in forest protection, forest fire prevention and firefighting; more than 460 of a total of 520 districts and 4,816 of a total of 5,985 communes with forests have established a commanding board to direct, administer and supervise forest owners to organize the implementation of forest protection, forest fire prevention and fire fighting in the locality; and to direct the work of combatting deforestation and forest fire fighting at grassroots level. However, there is no data on the implementation results of these issues, especially on pest and disease control.
Undertake research into valuation of FES, develop payment mechanism for environmental services for the forestry sector. From 2007, develop and implement Vietnam Forest Protection and Development Fund (VNFF) activities.	A VNFF system has been established, including central funds under MARD and 45 provincial funds, of which 11 are under the Provincial People's Committee and 34 are under DARD.
Develop and consolidate protection forest system to cover a total area of 5.68 million ha and special-use forest (SUF) system to cover a total area of approximately 2.16 million ha.	SUF: Currently, the country has 164 SUF management boards, managing 99.6% of SUF area, of which: 33 are national park management boards; 57 are nature reserve management boards; 12 are species-habitat conservation area management boards; 53 are landscape protection area management boards, managed by local agencies; and 9 are forest management boards that focus on scientific research and experiments. PTF: Currently, there are 231 protection forest management boards nationwide. The management organization system of protective forest in localities has not been unified: 153 PTF management boards are under DARD; 55 boards are under the District People's Committee; five boards are under the Provincial People's Committee, and 18 boards are under FPD. No data is available on the area of PTF and SUF that is being effectively managed.
Continue to test and replicate community forest management and protection models, and other models.	No data exists on the implementation results of these objectives.
100% of forest owners, villages and communes with forests will have forest protection forces; 100% of PTF and SUF will be managed by owners and have Forest Protection and Development Plans; 100% of forest protection and development staff will be trained to improve their capacity.	At present 512 out of 1093 (46.84%) villages have established specialized forest protection forces.

Although the 'Protection, biodiversity conservation and environmental services development' program refers to biodiversity conservation, our interviews with experts revealed that forest biodiversity conservation had not been especially effective, because biodiversity goals were not upheld in forestry planning, management and investment. In the previous stages of the forestry development strategy, biodiversity conservation is mentioned, but with no specific goal or targets to be achieved in this respect. In the SUF, where the primary goal is nature conservation, investment in biodiversity conservation activities account for a very low proportion (sometimes none) of total investment. There are no specific standards or reporting requirements for biodiversity status and development (except for forest cover). This does not encourage management boards to focus on conservation.

A key objective under this program is the development of payment for forest environmental services (PFES). Figure 10 shows that revenue from PFES has increased sharply over the last decade.

PFES has received considerable attention and support from related government ministries and agencies, and many legal documents have been issued in the form of Decrees and Decisions of the Prime Minister, as well as Circulars and Decisions made by MARD, creating an important legal basis for the implementation of PFES policy. However, according to Pham et al. (2013), the implementation of PFES still faces many difficulties. This is for a number of reasons, including: an incomplete forest inventory; slowness in land and forest allocation; a large number of service providers scattered across remote and isolated areas, with limited technical and financial capacity at both central and local levels; inadequate coordination between agencies; high transaction costs due to a large number of forest owners (forest owners being individuals and households); complicated administrative procedures; limited implementation capacity among both environmental services buyers and environmental services providers; conflicts of interest; inadequate sharing of information and cooperation among relevant agencies; ambiguity in the legal status of communities in terms of their ability to participate in PFES agreements, reducing the interest of local communities in forest protection and development; and low rates of payment compared to high opportunity costs. More importantly, most of the policy guidelines for PFES focus on the organizational structure and operation of the VNFF at all levels and financial reporting guidelines, without specific guidance on monitoring and evaluation (Pham et al. 2013; Pham et al. 2018d). Some challenges in terms of improving the effectiveness of PFES have also been summarized by Pham et al. (2018d) (Box 3).

Interview results with experts reveal that although the forest law violation indicator does reflect the reality of local-level forest law enforcement, thus indirectly demonstrating the environmental effectiveness of the PFES program, this indicator does not give any indication of the quality of forests affected, nor of the environmental value of those forests. It is necessary, therefore, to add other evaluation criteria, particularly indicators that show

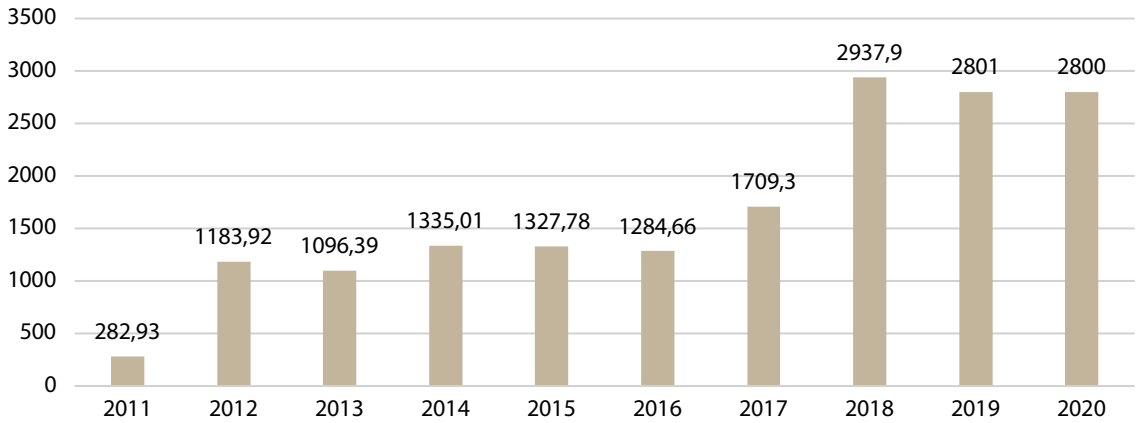


Figure 10. Total payment for forest environmental services (PFES) revenue between 2011 and 2020

Source: Authors compiled using data provided by VNFOREST 2020

Box 3. The challenges of improving the efficiency of PFES

- Deforestation and forest degradation take place mostly in the North Central, Northeast, Central Highlands and Northwest of Vietnam (GoV 2016; Khuc et al. 2018). However, to date, revenue from PFES is mainly concentrated and distributed in the Northwest and Central Highlands (37% and 35% respectively) because these two regions have a high proportion of total forest land (80% and 60%), while revenue (and distribution) in the North Central and Northeast are limited (6% and 11% respectively).
- The largest mangrove areas in Vietnam are concentrated in the South Central and Southeast regions. These play a critical role in climate change adaptation and mitigation as well as the voluntary nationally determined contribution (NDC) of Vietnam. Despite this, PFES revenue that is reallocated to these regions is just 2% to 9%.
- Despite high expectations around the potential revenue and impact of PFES, out of 40 provincial forest protection and development funds (FPDF)s, just 13% of these provincial-level Funds receive more than VND 100 billion in revenue from PFES; 17.5% of the Funds receive less than VND 1 billion. According to stakeholder interviews, provinces receiving less than VND 1 billion in PFES income find it difficult to cover basic operating costs; some provinces have to find additional funding to cover related expenses. In these provinces, local authorities must consider ways of optimizing the effectiveness of the PFES income they receive.
- Similarly, although Vietnam has 33 national parks and 174 protected areas, according to VNFF (2018) data, just 13 national parks (39.3%) and 36 protected areas (20.68%) receive income from PFES. Just 6% of protected areas receive over VND 10 billion from PFES; whereas 31% of national parks, 28% of protected areas and 15% of national parks receive less than VND 500 million/year. This shows that only a few national parks and protected areas are currently participating in the PFES program, so PFES income is insignificant for many national parks.

Source: Pham et al. 2018b

Table 10. Number of violations of the forest protection and development law and damage to forest area

Indicator	Unit	2006–2010 (GoV 2017)	2011–2015 (GoV 2017)	2016–2020 (GoV 2019)
Total number of violations	Case	195,825	136,125	83,000
	%	100	69.5	42.4
Average number of violations	cases/year	39,165	27,265	16,600
	%	100	69.6	42.4
Total damaged area	ha	27,732	13,239	9,100
	%	100	47.7	32.8
Average damaged area	ha/year	5,546	2,648	1,820
	%	100	47.7	32.8

Source: Authors compiled using data provided by VNFOREST 2020

the quality of forests, as well as indicators that relate to biodiversity. The interviews also revealed that the goal of building a specialized forest protection team at village and commune levels was not achieved as it depends heavily on financial resources, community cohesion and management capacity of village authorities.

5.3 'Wood processing and forest product trade' program

Wood processing and trade in forest products are expected to be key economic sectors in Vietnam and create jobs for two million people. Table 11 shows that most of the goals set out under the 'wood

Table 11. 'Wood processing and forest product trade' program: Objectives, targets and implementation results

Program objectives and targets		Implementation results		
		2006	2019	2020
Reorganize the wood processing industry		1,200 wood processing enterprises[1]		5,500 wood processing enterprises[2]
Increase the production capacity of the forest product processing industry to meet domestic and export demands.	The value of exports increased by USD 7 billion (3.5 million m3 of products) (see Figure 11)	USD 2.18 billion	USD 11.3 billion	USD 12.7 billion (estimated)
	The total value of exports and domestic consumption increased		USD 15 billion	
	The export market is expanding	60 countries and regions	140 countries and regions[3]	
	Now meeting demand for wood for processing, production, domestic consumption and export		75% raw materials	
NTFP to become a primary industry[4] NTFP exports in 2020 reach USD 0.8 billion		USD 0.23 billion		USD 0.9 billion (estimated)

1 31% state-owned enterprises, 65% private enterprises, 4% joint venture enterprises
2 5% state-owned enterprises, 95% private enterprises
3 focused on five major markets: United States (43%), China (14.6%), Japan (14.1%), EU (~10%), Korea (8.2%)
4 i.e. to make up over 20% of the total forestry production value

Source: Authors own data collection, based on different sources

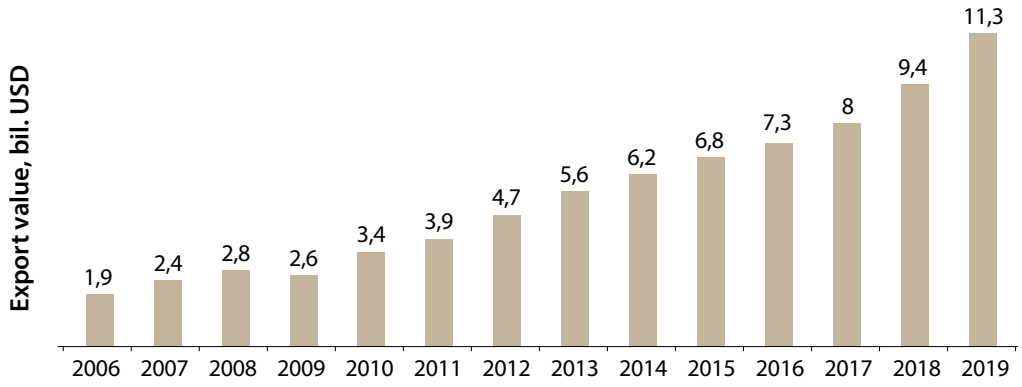


Figure 11. Export value of forest products between 2006 and 2020

Source: Hoang 2020

processing and forest product trade' program were either achieved or exceeded; only the target for NTFP production was not achieved as expected.

The area of forest products processing and trade still faces a number of limitations and issues, however (Hoang 2020):

- Enterprises are mostly micro and small in scale; only 3.5% have investment capital over VND 50 billion
- There are not many highly-processed, high-value, Vietnamese-branded products
- A significant proportion of wood chips, raw products and raw materials are still exported
- There are no linkages between the supply and the processing of raw materials
- Concentrated areas for the sourcing of raw material have not yet been created

- There is a lack of financial support and long-term projects that support high quality and large-diameter timber production
- The quality of material 'input' into processed products cannot be controlled along the forest product value chain; as it is unclear where raw materials are sourced from, the quality and legality of these products cannot be certain
- There is limited promotion of trade and market development

The expansion of the wood industry in Vietnam is also facing many difficulties, in particular competition for raw materials and pressure to comply with new international agreements, such as the VPA-FLEGT (Pham et al. 2020).

5.4 'Research, education, training and forestry extension' program

Table 12 shows the 'research, education, training and forestry extension' program has nine objectives and targets. However, just two of these nine objectives were achieved or exceeded, against the targets proposed in the original strategy. Some reasons for this are explained in the section on the social goals, as well as in Table 12.

Other challenges of implementing this program included:

- State budget investment in research and training programs is negligible, amounting to just 1.3% of the total capital needs of all five programs under VSFD 2006–2020 (Tran 2020).
- Current research projects mainly focus on silviculture (about 75% of the total government budget for research is spent on this), forest industry, and forest product preservation and processing (16.4%), while economic, market and policy impact-related research is very limited. The investment budget for research into forestry economy, markets and institutions amounts to just 2% and research into forest environmental services and biodiversity accounts for just 6% of total scientific research funding (Tran 2020). This reduces the practical applicability of many studies. Research shortages in new and highly applicable fields – like forest resource pricing, development of forest ecosystem services, forest environment leasing, market development, ecotourism development, financial mechanisms and policies for forest development, value chain production development, attracting private investment in the forestry sector, benefit sharing, and the benefits of forestry – have resulted in an inadequate social awareness on the role of the forestry sector (Tran 2020). Most current forestry research is financed internationally and undertaken through international research organizations such as CIFOR and ICRAF and through civil society organizations like PanNature.
- Between 2008 and 2017, research into silvicultural techniques mainly focused on planted forests and non-timber forest products; natural forests were not paid enough attention (Tran 2020). Almost all research focused on natural forests was funded by international organizations.

5.5 'Institutional reform, policy, planning and monitoring' program

For a list of policies and laws on forestry during 2006–2020 see Appendix 1.

The majority of interviewees said that had been progress in terms of the forest policy framework but it was still incomplete; despite the significant number of documents, they were often overlapping, inconsistent and saw low enforcement. Some policies were inadequate and unsuited to realities on the ground, but they were being slowly adjusted; specific policies to ensure that international standards for sustainable forest management are being met, are also lacking. Some areas still lack appropriate policies, including forest product processing, market access, forest product trade, research, transfer of scientific and technical advances in forestry, capacity building training for forest owners and forestry extension.

Table 12. 'Research, education, training and forestry extension' program: Objectives, targets and implementation results

No.	Program objectives and targets	Implementation results
1	Complete and update programs and training curriculums; link training with forestry extension	• The Vietnam National University of Forestry and the University of Colorado in the United States have partnered to establish the Natural Resources Management program and trained more than 200 engineers since 2010; likewise, as part of the same collaboration the international master's program in Forestry in cooperation with Germany, Laos and Cambodia, recruited 29 trainees from six countries from 2017 to 2019. • A number of international cooperation projects to develop the training framework have been implemented including: the Regional Climate Change program, funded by USAID; the Reducing Emissions from Deforestation and Forest Degradation (REDD+) program funded by UNEP; the SFM and biological economy program, funded by the Erasmus+ scheme. • Grassroot-level forestry extension workers do not yet meet the requirements, in terms of quantity and quality. • Linkages between research, training and forestry extension are not yet effective; in reality, the applicability of research results and the transfer of technology and techniques is limited and unsustainable (Tran TTH 2020).
2	Regularly train 5,000 students/ year, vocational training for forest farmers and forest product processing villages	• Regular training in the forestry sector has not developed in a stable manner. The Vietnam National University of Forestry had a sizeable number of students pre-2015; in 2014 there were 4,800 students for example. Since 2016, however, there have been difficulties in attracting students to the forestry sector, and the number of students has declined significantly. Between 2018 and 2020, the Vietnam National University of Forestry and its affiliated branches enrolled an average of 1,500–1,800 students per year (at all training levels), and at formal university level, just 500–600 students[1]. • The contradiction between the development of wood export and the number of students studying forest product processing partly reflects the inadequacy between the content, program and form of training with the actual needs of society.
3	Ensure 1–2 forestry universities meet international standards by 2020	• Significant progress has been made in terms of international cooperation in forestry research and training; with a number of training programs successfully developed and operated in association with foreign universities; collaborative research projects are also being implemented alongside international organizations, contributing to meeting the target for innovation and international integration. • However, no Vietnamese forestry-focused universities are currently working at international level, mainly due to a lack of investment. Looking at stakeholders' priorities for investment during 2011–2019, human resource training did not appear at all (Pham et al. 2020a) and investment rates for programs on research, education, training and forestry extension accounted for just 1.35% of the total planned investment for strategy implementation (Pham et al. 2018c).
4	Supply one forestry extension staff to each commune with significant forest area; development of non-state forestry extension services; link forestry extension and training with forest owners and businesses	• A central-to-local system of agro-forestry extension is now underway. This has diverse activities to improve the capacity of local people and forest owners, and will link research, training and the forestry extension system. • Local forestry extension officer requirements have not yet been met, neither in terms of quantity nor quality (Moeliono et al. 2016). • The target of having a forest extension officer for 100% of communes with significant forest area has not been met.

No.	Program objectives and targets	Implementation results
5	Research key fields, improve technologies for the forest product processing industry, and formulate breakthrough policies for the forestry sector.	• Research focused on key forestry areas[2] and positively contributed to sector achievements like the rate of forest coverage, value of timber exports and diversified financial resources for forestry development. • MARD developed and implemented the Vietnam Forestry Research Strategy to 2020 under Decision No. 78/2008/QD-BNN dated 1 July 2008. The overall goal was "contributing to the orientation of forestry development, effectively implementing the VSFD and the Master Plan of Vietnam Agricultural Research to 2020, meeting the requirements of industrialization, and modernizing Vietnam's agriculture and rural areas by 2020" through three specific objectives: i) providing a scientific basis for awareness-raising around the importance of forestry development; ii) forestry production and biodiversity conservation; iii) strengthening research capacity. The strategy consisted of three main strands: i) identifying research priorities; ii) strengthening research capacity; and iii) improving research effectiveness. It identified six priority areas for research: i) planning, monitoring and assessment of forest resources; ii) forestry policy and institutions; iii) SFM; iv) forest environment and biodiversity; v) silvicultural techniques (natural forests, plantations, NTFPs); vi) forest industry, conservation and forest product processing. Solutions to address gaps and challenges in the forestry sector included: i) research; ii) human resource development for researchers; iii) capital resources; iv) policies to support forestry research. • Implementation of the Vietnam Forestry Research Strategy 2006–2020 achieved encouraging results, with: 227 national tree varieties recognized as technically-advanced; plantation yields of key tree species (acacia, eucalyptus) reaching an average of 20 m3/ha/year; productivity of natural forests reaching 4.3–6 m3/ha/year; 45 standards developed for forest tree varieties (Vietnam Standard – TCVN); 61 standards developed for silvicultural techniques; 52 standards for forest product preservation; and research results forming the basis for the development of many important policies in the forestry sector (VNFOREST 2020a). • The number of research projects on economics and policies is still limited; this has meant that not much has been contributed to the formulation of policies to attract investment in forestry; the role the forestry sector plays in the sustainability of Vietnam's socio-economic development has not yet been clarified; and the important role of science and technology in promoting growth, restructuring, and enhancing added value in forestry production, has not yet been brought into play.
6	From 2008, teach forest and environmental protection in schools	No data exists on the implementation results of this objective.
7	Train 80% of local forest managers. Improve capacity of forestry institutes and universities	Advanced training and retraining for forestry staff has been carried out in various ways, helping to improve the efficiency of forest management and the sector at large. In the area of forest product processing and trade, out of a pool of around half a million workers, 55–60% have been trained to meet task requirements (VNFOREST 2020b). Other areas have no specific reporting data on this objective.
8	Attract 50% of all economic sectors to participate in forestry extension activities	The forestry extension models have attracted more than 58,350 households to participate and planted about 86,000 hectares of forests in 40 provinces, mainly in the Northern Mountains, Central and Central Highlands. More than 80% of farmers in the paper-material area know how to apply intensive planting techniques to yield 15–20 m3/year for Eucalyptus and Acacia hybrid. Many agroforestry models give an average harvest of VND 8–10 million/ha/year, models of forest gardens and forest farms from VND 10 to 15 million/ha/year (Tran DN 2020).
9	Improve qualifications for 80% of farming households	No data exists on the implementation results of this objective.

1 Estimated through consultation with Forestry University staff, 2020
2 Biotechnology, forest seedings, forest product processing, afforestation/reforestation

Source: Authors compiled, using data provided by VNFOREST 2020 and Tran DN 2020

Table 13. 'Institutional reform, policy, planning and monitoring' program: Objectives, targets and implementation results

Program objectives and targets	Implementation results
Develop and update the system of policies, laws and institutions so that it is more decentralized, giving more power to the localities; develop sustainable forestry towards commodity production and forest socialization.	**2006–2010:** The following legal motions were put in place: • Government Decree No. 99/2010/ND-CP dated 24 September 2010 on PFES policy; • Government Decision No. 147/2007/QD-TTg and Decision No. 66/2011/QD-TTg on the policy of developing forest production during 2007–2015. MARD collaborated with other ministries and sectors to develop and issue 100 documents in the forestry sector, creating a legal framework for the implementation of forestry development. **2011–2015:** • 48 legal documents on forestry were developed and issued. This institutionalized the government's undertakings and policies on forest socialization, forestry sector restructuring, strict management of natural forests and sustainable forestry development. In turn this helped to create jobs, increase income and improve the livelihoods of forest workers. **2016–2020:** • TPSFD 2016-2020 and the REDD+ program were approved, ensuring comprehensive forestry development along the value chain, as well as economic, social and environmental sustainability through reducing greenhouse gas emissions, approaching the carbon market, green growth, attracting international support, improving people's lives and developing the country sustainably. • The Law on Forestry 2017 was passed by the National Assembly in 2017. By 2019, 15 legal documents had been issued to guide the implementation of this Law, creating a new shift in forestry policy (Tran 2020). • Decision No. 07/2012/QD-TTg decentralized management responsibility for forests and forest land to People's Committees at all levels; this was critically important at district and commune level, as responsibilities for: direct management of forest resources; land allocation; forest contracting; and control of forest land use; were given to forest owners in the local area.
Develop mechanisms and policies to encourage all economic sectors to participate in forest protection and development, and encourage domestic and foreign economic sectors, village communities and households to participate in the economic development of forestry	• SUF management boards developed projects to ensure the conservation and sustainable management of natural resources (Decision No. 186/QD-TTg in 2010 of the Prime Minister and Decree No. 117/2010/ND-CP on organization and management of SUF); the Sustainable Forestry Development program for 2016–2020 was approved, with a focus on the market and diversification of forestry services. • Vietnam and the EU signed a Voluntary Partnership Agreement on Forest Law Enforcement, Governance and Trade (VPA-FLEGT) on 19 October 2018, creating opportunities for market expansion, improving forest management institutions, tackling illegal logging and timber trade and contributing to the sustainable development of Vietnam's wood processing and export industries. • The policy on PFES, under Decree No. 99/2010/ND-CP dated 24 September 2010, is a new breakthrough in the development and implementation of forestry policy, as it: mobilizes social capital sources for industry development; contributes to increasing household and community income (particularly poor households and ethnic minorities) through forest protection contracts; and thus reduces the pressures of deforestation and forest loss. The average income of households contracted to protect forests under PFES is VND 2 million/household/year. PFES revenue also helped to offer a financial alternative for 199 management boards and 84 forestry companies facing closure when their primary income (timber) came to a halt after government enforced the closure of natural forests. • The 2017 Forestry Law institutionalized the policy of forestry socialization, defining the relevant rights and obligations of organizations and individuals that have been allocated forests and forest land.
Reorganize and improve the effectiveness of the state management system for forestry, to unify functions of forest management, protection, utilization and development; clarify the functions and objectives of forestry organizations at all levels and diversify types of forestry services	• Before 2019, forestry activities were implemented under the Law on Forest Protection and Development 2004. The Law on Forestry took its place from 2019. • Achievements in terms of enhancing the effectiveness of the state management system on forestry include: decentralization of responsibility for state management of forests and forest land to People's Committees at all levels (Decision No. 07/2012/QD-TTg decentralizing the responsibility for state management of forests and forest land); regulating the functions, objectives, powers and organizational structure of MARD (Decree 199/2013/ND-CP dated 26 November 2013 defining functions, objectives, powers and structural organization of MARD); strengthening the organization of forest rangers, ensuring that conditions are appropriate for forest rangers to be able to fully perform their forest protection functions; supplementing forest development so that the forest protection department (FPD) become the focal point for local forestry management agencies, with full power to perform the assigned forest management and protection duties through strengthening management of expertise, skills, weapons and support tools (Prime Minister Decision No. 1920/QD-TTg dated 24 October 2014, approving the scheme to strengthen the organization and improve the capacity and effectiveness of forest rangers during 2014–2020); provincial FPDs were later identified to assist DARDs, as an advisory body for the state on forestry management (Decree No. 01/2019/ND-CP of the Government on Forest Protection and Specialized Forest Protection Force).

Program objectives and targets	Implementation results
Develop mechanisms and policies to support SFEs that have reformed into companies, as well as effective production and business activities; implement step-by-step the equitization[1] of forestry companies; and create favorable conditions for production and business activities in line with market mechanisms	• The policy of socialization around forestry activities (i.e. involving all social actor groups in forest protection and development activities) was implemented; to complement the activities of long-standing organizations such as the Vietnam Forestry Science and Technology Association (VIFA), Vietnam Timber and Forest Products Association (VIFORES), the establishment of new forestry associations was encouraged and supported, such as the Vietnam Forest Owners Association[2] • the organizational structure of forestry production and business was reformed; a total of 256 SFEs have been transformed into 148 state-owned limited one-member[3] forestry companies, three joint-stock companies and 91 protection forest management boards; 14 SFEs were dissolved. • by 2019, some 136 forestry companies were in the reform process, with the following interim results: 3 out of 3 companies had been transformed into a 100% state-owned limited companies performing production and business tasks; 59 out of 60 companies had been transformed into one-member limited companies with 100% government capital, performing public tasks; 9 out of 30 companies had been equitized; 8 out of 22 companies had been transformed into limited companies with two or more members; 5 out of 5 companies had been changed to forest management boards; and 9 out of 16 companies had been dissolved.
Develop, implement and expand forms of community forest management and protection	• Decision No. 07/2012/QD-TTg created the legal framework for forest co-management, benefit sharing, rights and obligations of special-use forest management boards and local communities, with the aim to contribute to income generation and the improvement of livelihoods for communities under forest protection contracts; • Decision No. 24/2012/QD-TTg, on the policy for investment in and development of SUF during 2011–2020, stipulates support for communities in buffer zone areas and permits the use and lease of SUF for ecotourism development.
Establish the State forestry extension system at all levels and adopt a support mechanism for voluntary forestry extension organizations for village communities with large forest areas.	• On the basis of the Forest Extension Development Project 2008–2010 with a vision to 2020, issued by MARD in Decision No. 832/QD-BNN-KHCN dated 17 March 2008, the forestry extension system, formed from central to local levels, helped to improve the capacity of people and forest owners, and form initial links between managers, scientists, business owners and forest owners in some product chains and regions.
Establish specialized monitoring and evaluation mechanisms to support forestry planning at all levels	• The 'General investigation and inventory of all national forest during 2013–2016' project was implemented, according to Decision No. 594/QD-TTg dated 15 April 2013 of the Prime Minister, Circular No. 12/2014/TTLT-BTC-BNNPTNT dated 24 January 2014; Decision No. 1157/QD-BNN-TCLN dated 26 May 2014 of MARD; results of this project have enabled the development a national database to monitor and oversee forest resources, and forestry management and development. • With the support of various donors, a monitoring and evaluation system was established to facilitate forestry planning: the Forestry Sector Monitoring Information System (FORMIS) platform; this allows the newly-established forest resource database to be integrated with the national forest inventory results, and updated data on forest change, REDD+, forest and PFES. • A 'Forest Monitoring System' (FMS) was developed with the support of international organizations (USAID, CIFOR and GIZ); this automatically connects satellite images, simultaneously sent to the FDP and big forest owners, to a forest change detection tool. The system also integrates data on boundaries, planning around three types of forest and forest status, and can monitor forest changes visually and easily (Tran 2020).

1 'equitization' is a Vietnamese English term that denotes the conversion of a state-owned enterprise in Vietnam into a public limited company or a corporation.

2 established under Decision No. 2905/QD-BNV dated 22 August 2016 of the Ministry of Internal Affairs, this is a social-professional organization representing approximately 1.5 million households, who are part of the 10,000 village communities allocated forests, and the hundreds of PTF and SUF management boards and forestry companies. The organization aims to: gather, support and help each other in forest governance; exercise the rights and obligations of forest owners; and contribute to forestry development.

3 A state company which has just one entity managing and owning it. This differs from companies which can be co-owned and led by multiple actors at the same time.

Source: Authors compiled, using data provided by VNFOREST 2020

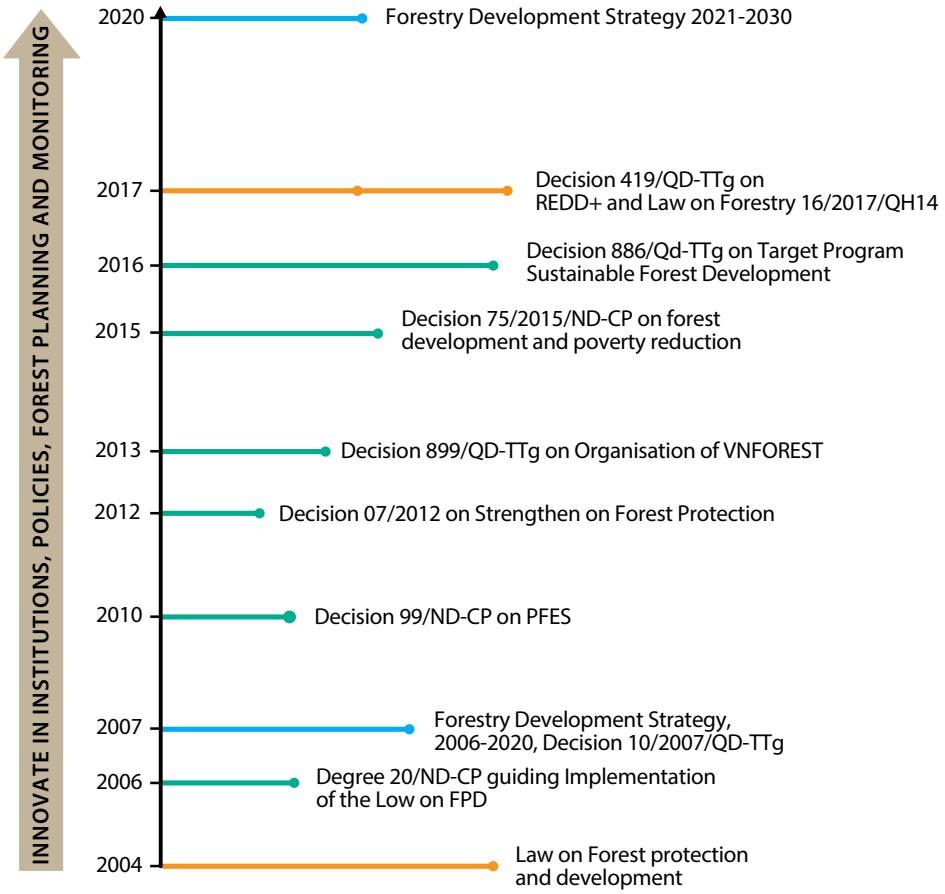


Figure 12. Milestones in forestry policy development between 2004 and 2020

Source: Tran 2020, with simplified by authors

6 Results of resource mobilization for implementation of the strategy

Sustainable finance is an important factor in implementing an effective strategy. Table 14 indicates that Vietnam's forestry sector successfully mobilized resources to implement the strategy, exceeding expectations.

Between 2010 and 2020, the state issued various investment policies that increased support for forest protection and development; support for forest protection increased from VND 100,000/ha/year in 2006 to VND 200,000/ha/year in 2010 (Decision No. 60/2010/QD-TTg dated 20 September 2010), before increasing to an average of VND 300,000/ha/year in 2016 (Decision No. 38/2016/QD-TTg dated 14 September 2016); for zone I communes (communes that have less severe economic and social difficulties) and zone II communes (communes that have difficult socio and economic conditions but that have stabilized over time) this rate was VND 400,000/ha (Decree No. 75/2015/ND-CP dated 9 September 2015) while in coastal areas the rate was 1.5 times higher than average (Decree 119/2016/ND-CP dated 23 August 2016).

Research by Pham et al. (2018) indicates that state budget, including both central and local, amounted to just 21.5% of the total capital mobilized, which was 97% of the amount targeted from state budget; this was allocated mainly for afforestation activities. Although not reaching the original target, the increase in state budget investment over time reflects the government's interest in the forestry sector. State budget is the main source of finance in poor provinces, where non-state budget mobilization is extremely limited. Between 2006 and 2010, resources mobilized from organizations, individuals and households accounted for more than 30%; while during 2011–2016 it made up 48% of financial investment in the forestry sector. PFES accounted for 22% of the total forestry budget, and played an important role in paying the costs of forest protection. Increasing investment outside of the state budget proves that the socialization policy around forestry has seen initial success. However, current investment efficiency in forestry is low; investments are fragmented, and data on forestry finance is not consistent nor systematically collected, causing significant challenges in terms of providing a comprehensive picture of forestry finance. Information gaps need to be addressed in future through a transparent and accountable national forestry financial monitoring system that helps policy makers to improve financial planning for the sector, as well as secure financing sources that generate greater returns (Pham et al. 2018c).

Table 14. Results of resource mobilization for implementation of the strategy

Required resources	Resources actually mobilized
Total capital demand to implement the 2006–2020 strategy was VND 106.759,06 billion. This was split across two phases: • VND 33.885,34 billion for 2006–2010 • VND 72.873,72 billion for 2011–2020	VND 125.886 billion in capital was mobilized for forestry development during 2006–2020, meeting 118% of the anticipated resource requirements. • VND 35.236 billion was mobilized during 2006–2010, equal to 104% • VND 90.402 billion was mobilized during 2011–2020, equal to 124%

Source: Authors compiled, using data provided by VNFOREST 2020

Pham et al. (2018a) also emphasized the role of new sources of finance in Vietnam, particularly REDD+. These authors believe REDD+ has great potential to create and contribute financially to support Vietnam's forestry sector. However, the reduction in both funding and commitment to REDD+ funding, the challenge of meeting donor requirements, and the difficulties of securing the funding required for national REDD+ implementation, suggest that REDD+ has limited potential to be a major contributor in the forestry sector. The Government of Vietnam identified that funding for REDD+ implementation can come from the public or private financial sector. In reality, however, the primary financial source for REDD+ in Vietnam is still international donors; the financial contribution of public and private budgets remains limited. Until now, REDD+ finance has been used haphazardly, without coordination among the involved parties, because the priority issues of REDD+ in Vietnam have not been clearly identified. Yet Vietnam faces various challenges in implementing and improving the effectiveness and efficiency of its REDD+ activities, because: financial data on REDD+ in Vietnam is insufficient and inaccurate; a clear definition of financing for REDD+ has not been determined; there is no national REDD+ financial monitoring system and limited technical capacity (in both government and civil society) related to the financial monitoring of REDD+ funds. To increase the potential financial contribution of REDD+ to the forestry sector in Vietnam, it is necessary: (i) to have better coordination across sectors, between donors and government agencies; (ii) to improve the capacity of government agencies and civil society organizations to monitor and manage REDD+ finances; and (iii) to develop and effectively implement REDD+ policies and measures so that the government can access payment based on results from different international funding sources.

At the provincial level, financial resources for forest protection came from six main sources: central budget; provincial budget; the national program on payment for forest environmental services (PFES); international projects; public-private partnership capital; and the private sector (Pham et al. 2019a). The synergy of these financial resources has encouraged provincial authorities, forest owners and provincial government agencies to better implement forest protection and development. However, forest owners still face many difficulties in accessing these funds due to the complicated application procedures for funding, the need for reciprocal funding, and the high initial investment costs to meet the criteria for accessing capital sources (Pham et al. 2019a).

7 Lessons learned from implementation of the Forestry Development Strategy 2006–2020

VFDS 2006–2020 implementation results show that the forestry sector has met most of its economic targets, but there remain challenges in terms of implementing and achieving social and environmental goals. Its successes are due to the strong political commitment of the government. The strategy was deployed nationwide, involved the entire political system from central to local level, and was implemented through key national programs and projects; as such many good results have been achieved. The rate of forest cover has continuously increased, and social awareness around forestry has been raised. The legal document system has promptly institutionalized the undertakings and policies of the Party and government on forestry, creating a legal framework across all levels and sectors, to organize the implementation of forestry development. Reasons behind the challenges of achieving the social and environmental goals are presented in Table 16.

Challenges in terms of local forestry development during 2006–2020, as highlighted by the 49 provinces, are shown in Table 15. Table 15 highlights four key challenges: (i) difficulties in securing capital resources (87.5%); (ii) the complexity of forest law violations (68.7%); (iii) an incomplete policy framework not meeting reality on the ground, with a large number of overlapping, inconsistent documents, and low enforcement efficiency (64.6%); and (iv) ineffective land and forest allocation policies.

Table 15. Challenges preventing the achievement of social and environmental goals during 2006–2020

Causes	Explanation
Politics, political institutions	• Limited planning and management of planning • According to interviewed parties, forest protection status is complicated, because in reality there are still cases of illegal logging, forest fires, forest encroachment, and violence against public service enforcers • The government does not apply strong enough sanctions • The local authorities are not fully undertaking their forest management responsibilities; staff capacity is limited and many are unqualified to undertake these responsibilities • The policy framework is incomplete and unspecific; some policies are do not respond to local realities
Technology	• Seed quality control is not yet strictly managed • The system of standards and technical regulations is insufficient
Social	• Awareness of forestry is not comprehensive, particularly around the value of forests, the connection between forestry and socio-economics, and the need for forests in the face of climate change mitigation and adaptation • Demand for rare and valuable forest products still exists as these products are high profitable • High population density puts pressure on forests due to a lack of productive land • Awareness-raising and education around forestry is still limited
Finance/economy	• Inadequate facilities • Government funding for forestry is lower than what is needed • There are no policies and mechanisms to attract investors • The investment environment is limited, the potential of forestry has not received much attention • Causes of deforestation and forest degradation are associated with economic development goals and infrastructure, requiring close linkage between sectors. Demand for land use for the development of other economic sectors leads to unstable and often adjusted planning • Limited income from forestry has not provided economic motivation for people and communities to actively participate.
Natural condition	• Forests are distributed across a large scale, with fragmented terrain, in difficult socio-economic areas • Climate change • Forest quality is low, not meeting the requirements for raw materials for the processing industry and export • The forest tree production cycle is long, with high risks and it cannot compete with the high opportunity costs of other agricultural crops
Competence	• Both technical and managerial human resources are lacking and weak • Infrastructure and technologies are poor and outdated • Financial resources are limited and do not meet demand

Source: Authors compiled from province reports, 2020

Table 16. Local challenges in forestry development during 2006–2020

No.	Challenge	Percentage of provinces highlighting this challenge (%)
1	Government capital is still low in comparison with the requirements and objectives set out; the investment mechanism is not balanced and no attention is paid to investment in forestry infrastructure	87.5
2	The situation of forest law violations is still complicated	68.7
3	The forest policy framework is incomplete and not meeting realities on the ground, with significant number of documents overlapping and inconsistent, and low enforcement	64.6
4	Difficulties, complications and slow and ineffective progress in the implementation of land and forest land allocation, and contracting for forest protection and to implement forestry socialization (i.e. involve all social actor groups in forest protection and development)	53.5
5	Poor forestry infrastructure	52.1
6	Planning for the three types of forests and the use of forest land does not match reality, is slow to be adjusted and often disconnected; forest boundaries are not clear either on maps or in the field; land encroachment and disputes are complex	44.2
7	Forest boundary markers are being put in place slowly	39.6
8	State management of forestry is still limited; implementation of forestry laws and policies has not been directed and verified properly; the state is not strict in terms of dealing with violations of laws on forest protection and development.	39.5

Source: Authors compiled from province reports, 2020.

8 Recommendations for development of the 2021–2030 strategy, with a vision until 2050

8.1 Global forestry development trends

Besides absorbing lessons from the implementation of the previous strategy, the Forestry Development Strategy for 2021–2030 with a vision to 2050, also needs to anticipate the global trend for forestry development (Box 4) and carefully consider this in the Vietnamese context (Box 5).

8.2 Local proposals for future forestry development

Proposals for future forestry development were compiled from 49 provincial reports so as to support the development of the forestry strategy for 2021–2030 (see Figure 13).

Relating to the development of the future forestry strategy, Figure 13 shows that local priorities mainly focus on improving infrastructure, increasing investment in reforestation, and developing forestry policies that are suitable for the regions.

8.3 Multi-disciplinary and comprehensive approach

Based on the results of interviews, document review and analysis, other priority issues that should be considered in the development of the future forestry strategy are listed below.

Development of forestry during 2021–2030, with a vision to 2050 needs to reform the growth model that relies on expanding area, volume and resources, to focus instead on increasing the value of products, thus increasing revenue on the basis of improved productivity, quality and efficiency. In a changing context, both nationally and internationally, it is necessary to develop Vietnam's forestry into a modern and innovative economic and technical sector. This means developing sustainably along the value chain, being consistent with the market mechanism, deeply integrating internationally, having an important position in the socio-economic development of the country, helping to build a successful social model of prosperity and thriving. The development of value chain forestry should be promoted by encouraging the development of value chain production linkages between forest owners, and forest product processing and trading enterprises.

Forest land planning and forest land allocation. Currently, MARD is developing a national forestry plan for 2021–2030 with a vision to 2050, in line with the Prime Minister's Decision No. 995/QD-TTg dated 9 August 2018. As part of this, it is necessary to review the land-use plan for 16,245 million ha of forests and forestry land. This land was allocated to the forestry sector for management under Resolution No. 134/2016/QH13 dated 9 April 2016 of the XIII National Assembly, to ensure a stable national forest estate. The strategic direction for planning and development of the three forest types is shown in Figure 14. Forest and forestry land are key physical assets for the nation. To maintain the stability of this national forest estate, land and forest allocation must be considered under the new strategy, as well as under continuous review to ensure the consistency of boundaries on maps and in the field; certificates also need to be granted for forest land-use rights to ensure that the real owners of forests are recognized and the long-term rights and interests of land users and forest owners are clearly defined. It is equally necessary to promote the potential and advantages of forests widely across society, as well as develop revenue-generating policies for forest protection and development like PFES, particularly in the context of increasingly severe climate change.

Box 4. Global trends to 2030

Over the next ten years, the regional and international situation will develop rapidly, unpredictably, and in a complicated manner. There remains significant focus on peace, cooperation and development, but strategic competition and local conflicts continue to be more complex and intense. Globalization and international integration continue to progress, but with many obstacles and challenges. Strategic competition, trade wars, and competition for high-quality resources, markets, technologies and human resources are increasing across the globe. Official development assistance (ODA) flows will decline while foreign direct investment (FDI) will go up for territories with favorable investment environments and production industries; this will bring high economic returns.

Many global issues related to forest resources and forestry – such as climate change and resource depletion – will occur in complex ways. By 2030, over 50% of the global population will lack water on a continuous basis; by 2050, species diversity will be reduced by 10% and old growth forests will be reduced by 13% globally; greenhouse gas emissions will increase by 50%, and the earth's temperature could increase by 3–6oC, with the added risk of forest fires and disease spreading. Bioenergy will thrive in the face of the need to fulfill climate change-related commitments. The global and domestic carbon markets will increase rapidly and operate on a large scale with the support of science and technology to reduce the cost of measurement, verification and commercial transactions. Some new trends in economic development, based on intelligent use of renewable and environmentally friendly biological resources, have been noted, particularly in Europe. These include: biological economics; circulating economics and donut economics (Pham et al. 2020c).
By 2030, the world population could reach 9 billion, of which 60% will be urban, and those on middle incomes are increasing in numbers. With this we see an increasing need for secure food, green, clean and beautiful living environments, and human health improvements, both mental and physical. This all points to the future development of urban forestry and enhancing the forestry sector's role in ensuring social security, health and relaxation.

Rapid developments in science and technology, especially biotechnology and the fourth industrial revolution, has created a breakthrough in many fields, bringing opportunities and challenges to all sectors and fields in all countries. Socio-economic development has shifted from reliance on natural resources to reliance on science and technology, in particular information technology, 5G and automation technology. In a rapidly changing and diverse context, the forestry sector will have to develop solutions to optimize, and invest in technology, manpower and brainpower, as well as develop new products and those with added value, like materials and products that are environmentally friendly, those that replace wood or combine it with other materials like plastic, paper and metal. Forestry businesses will focus on developing high-value trade, shifting from a focus on volume to a focus on creating products that increase value-added income. The demand for both digitalization, application and automation software for the forestry sector, and support services, logistics and customer care in forestry, will increase.

A number of issues need to be resolved from 2020 onwards. The impact of the Covid-19 pandemic has slowed global economic growth, with the potential result being an economic crisis and recession. Trade wars between international powers will strongly impact on the energy, wood and paper industries. The demand for paper production will decrease as electronic communication develops further; however, the demand for sawn timber and construction wood will increase due to more housing construction. Along with the rapidly changing business environment and market for wood products, there are a number of trends in forestry development across the world to pay attention to. These are: urban forestry; NTFPs; product diversification with an increasing rate of highly-processed products with high added value; market and trade emissions; development of tax and value-added tax for forest ecosystems; development of the stock market, stocks and forest bonds.

In particular, forestry's role in social security, health, poverty reduction and coping with climate change, is now increasingly being recognized by the world

Source: Pham et al. 2019; Pham et al. 2019b; Pham and Le 2020

Box 5. Twenty years of development in Vietnam

After 35 years of modernization, Vietnam has seen important achievements in socio-economic development; economic growth is relatively high and stable; people's living standards have been improved; the quality of human resources is higher; the legal system is increasingly comprehensive; the country's position and power, national cooperation, and international prestige have been increasingly enhanced. In the coming years, Vietnam will continue to integrate into the global market, economy and community more actively. As the country's global position and contribution increases, so will the advantages and challenges.

The Vietnamese economy has developed rapidly but unsustainably. Its economic growth has been low; Vietnam is not economically competitive, at either sectoral or national level; land is used ineffectively and inefficiently; the restructuring of production is slow; the quality of human resources has not met development requirements; science and technology have not become a driving force for development; the legal system remains incomplete, with policies lagging behind on-the-ground realities. Some even more severe risks like the 'middle-income trap', climate change and rapid aging of the population will be major challenges in the coming years.

Population growth. In 2020, Vietnam's population stands at over 97 million people, making up 1.25% of the world's population. The country ranks 15th globally in population size with a density of 313 people/km^2 and an average age of 32.5 years old. It is predicted that by 2030 the population will increase to 104 million people with a life expectancy of 75 years old. The population structure trend is changing and it is forecasted that Vietnam will become a country with an aging population by 2038, with the proportion of people aged 60 and over reaching over 20%. By 2049, about 25% of the population will be elderly.

Strong political commitment to the forestry sector. The Party and government have consistently understood the important role of forests and the forestry sector for the country's sustainable development, environmental protection and climate change response, contributing to social security, poverty reduction and national defense and security. Forest cover is an important national indicator.

The value of forestry production continues to grow steadily; export turnover of timber products and NTFPs maintain a high growth rate, especially in traditional markets. Forestry enterprises are transforming their production and business structures to focus on products with high value and high demand; foreign-invested enterprises in the wood industry, and the number of enterprises exporting, are on the increase. The challenge is to develop the domestic source of raw materials from plantation forests, so as to better meet demand for raw materials, both from the wood processing industry and for export.

Source: Author compiled from the Party's Socio-Economic Development Strategy 2021–2030 and MARD 2020.

Encouraging the participation of all economic sectors. The demand for large-diameter timber materials for the processing industry is huge, while the development of large-diameter timber production forests requires strict conditions like suitable sites and tree species, long-term capital, complex technology and decision-making with the full participation of all parties. Specific solutions that are realistic and attractive enough to encourage all economic sectors to invest in this field are required.

Investing in science and technology. Science and technology have made important contributions to the growth of the industry, improving the economic efficiency of planted forests with high-yield, high-quality varieties, the selection of suitable crop structures and intensive farming techniques. Science and technology research and application, especially advanced technology, should be promoted in forestry production, with priority given to fields such as seeds, silviculture, monitoring of forest resources, pest and disease

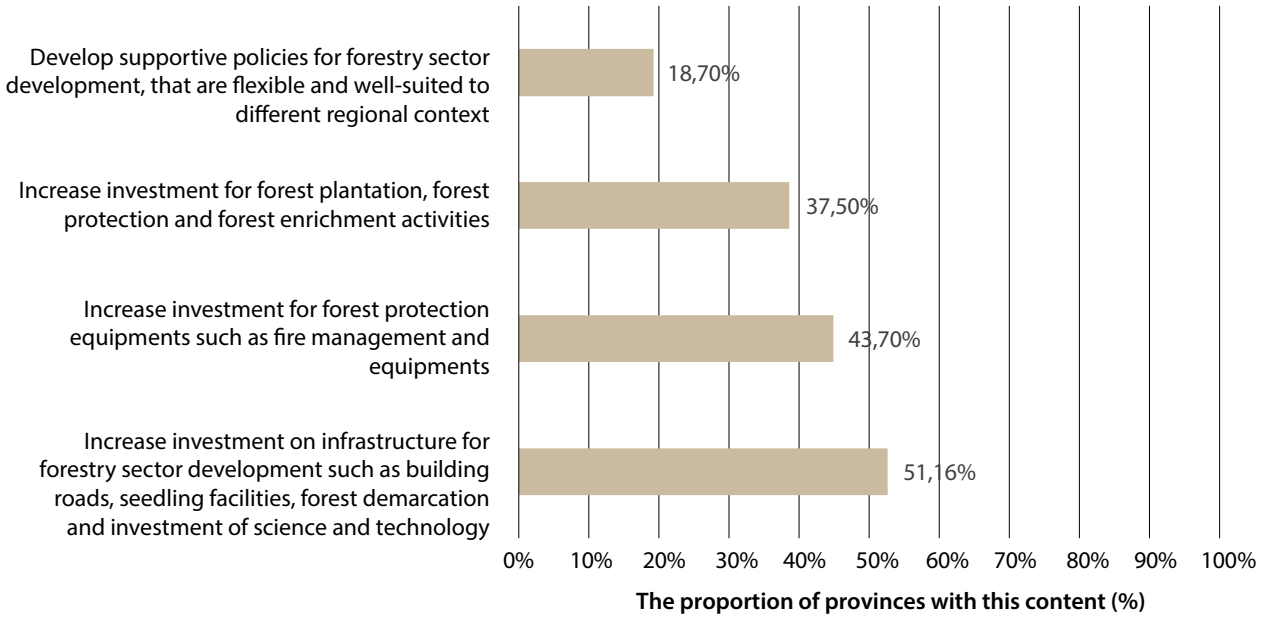


Figure 13. Local recommendations for forestry development after 2020

Source: Authors compiled from reports of provinces 2020

Special-use forests	Protection forests	Production forests	Forests on land outside of forestry planning
• Improve forest quality and biodiversity • Ensure that it meets national and international standards	• Improve the quality of protection forests in watershed areas • Restore and develop coastal protection forests • Plant protection forests in urban areas and industrial zones to protect the environment	• Improve efficiency of manufacturing and business • Develop concentrated raw material forests, prioritizing large-diameter timber, NTFPs and agroforestry	• Review and adjust to ensure all forests are managed in a uniform manner • Recognize real owners • Include in the 'three forest type' system, so it becomes part of a stable national forest area

Figure 14. Strategic direction of development planning for the different forest types

management and forest fire. It is equally important to: (i) promote the role of science and technology as an important factor in improving the productivity and efficiency of forestry production and business; (ii) support and invest in science and technology research and application, which helps to identify potential and advantages as well as ensure efficient use of forest resources; (iii) reform mechanisms and policies to encourage all economic sectors to participate in scientific research and application of advanced and environmentally-friendly technologies; and (iv) support innovation and develop high-quality human resources to produce new products with high added value, saving raw materials, promoting Vietnamese brands and developing commodity production along the value chain.

Market expansion and market-based sustainable forestry development with international integration. The new strategy will require creative application of a market-based approach for strategy implementation. This will see Vietnam expanding markets, participating in trade agreements and actively integrating on a global scale. Consistent development, in line with the global trends of sustainable development, green growth and climate change adaptation, is key to consensus building and the mobilization of social resources and international communities working

in forestry. A sustainable forestry development strategy that is based on a market approach will involve: (i) socialization and organization of production and business linkages along the forest product value chain; (ii) attracting resources and ensuring the participation of all economic sectors in forestry activities; (iii) taking a market-based approach to the mobilization, allocation and use of production resources, especially land and forest resources; (iv) actively participating in global supply chains, promoting Vietnam's advantages and taking advantage of opportunities for development; (v) integrating international standards and developing Vietnamese brands; (vi) fully implementing international commitments on nature conservation, biodiversity, environmental protection and climate change and forest product trade regulations; (vii) striving to become one of the leading countries in the production, processing and export of wood and forest products; and (viii) enhancing Vietnam's role in the international arena. The government will need to invest in developing protection forests and special-use forests and accelerating the construction of forestry infrastructure to attract and support all economic sectors to participate in forest development.

Biodiversity enhancement. The new strategy will need to consider: the protection, rehabilitation and management of natural forests (NFs) in line with the sustainable forest management (SFM) plan, with particular focus on biodiversity conservation and forest environmental services; minimizing changes to NFs to purposes outside of forestry; rationally exploiting unused or inefficient forest land areas; completing land allocation, forest allocation and forest leasing through issuance of certificates on forest land-use rights; ensuring that all forest areas and forest land is allocated or leased to real forest owners in all economic sectors; ensuring suitable conditions to enable forest protection and management and the sustainable development of forest resources; promoting SFM to link conservation and development with the active participation of stakeholders (e.g. government, private sector, forest owners involved in forest management); promoting forest certification; continuing to improve policies and technical guidelines on SFM and forest protection; having specific policies on land ownership or use, and tax policies; providing guidance for diverse groups (i.e. individuals, households, groups of households and communities); improving the capacity of stakeholders on SFM and forest certification; and integrating and developing policies and guidelines related to ecosystem-based adaptation.

Currently there is a lot of discussion on forest classification. However, forest classification is mainly based on management objectives; the effectiveness of forest protection and development, and biodiversity conservation does not depend on forest classifications but on the measures taken to achieve forest conservation and development goals. Combining two types of forest, i.e. protection forest and special-use forest, into one category will not help Vietnam to achieve its goal for conservation area expansion, for example. The potential to expand the area of special-use forest is not high, under the current forest land bank. A few remaining small-area Species and Habitat Conservation areas could be added to the list of special-use forests (or other terrestrial system of protected areas). It is suggested that the identification of Key Biodiversity Areas (KBA)[2] could help in the expansion of the protected area system. This is true in principle; the KBA is a good tool for identifying biodiversity hotspots. However, with the existing land bank, it is not feasible to expand the area of special-use forest to include every KBA. The KBA will be a more important and relevant tool for helping to identify (geographically) priority areas for conservation investment. Vietnam's protection forests are not protected areas or conserved areas, so the merging of these two types of forests does not help increase the protected areas as required by the international agreement Aichi Target 11. To increase this area, Vietnam needs to put in place a legal framework to recognize and report OECMs[3] (including many areas of protection forests, and even production forests). In addition, OECM can help to identify and report conservation results in areas other than forestland, such as private lands, or military zones. Biodiversity in the forestry sector will depend on two things: i) reinforcement of the special-use forest system, focusing on investments in biodiversity conservation objectives and activities; and ii) improvements in biodiversity conservation planning outside the special-use forest system (protection and production forests). In order to improve the effectiveness and content

2 http://www.keybiodiversityareas.org/

3 https://www.iucn.org/commissions/world-commission-protected-areas/our-work/oecms

of forest biodiversity conservation, the new Forest Development Strategy should:

- Identify existing protection forests that have conservation value and potential to contribute to biodiversity conservation goals, and help districts set their management goals in this respect.
- Clearly define biodiversity conservation goals at different levels (sector-wide, provincial, sub-sector), with specific monitoring and reporting requirements for current status and development, and key biodiversity components (species, habitats, ecosystems). This requirement should be mandatory for all SUFs and certain valuable protection and production forests.
- Apply the assessment of SUFs according to international standards on the effectiveness of management of protected and conservation areas. At present, the IUCN Green List Program has a set of global standards that can be applied at the local level in accordance with SUFs and some protection forests, in order to evaluate and monitor governance, design and planning, management effectiveness and conservation outcomes4 (Vietnam has participated in this program and related guidelines are available in Vietnamese). The Green List has also been approved by the Convention on Biological Diversity (CBD) and required by the Contracting Parties (including Vietnam).
- Allocate funding for biodiversity conservation activities, especially for biodiversity monitoring and reporting in SUFs and protection zones. Funding for species conservation actions, including in-situ and ex-situ conservation, such as research, breeding and re-stocking, should also be included in the investment strategy of the forestry sector.
- Review, supplement and organize the implementation of proposed schemes and programs, such as the scheme on strengthening the management capacity of the protected area system until 2025, with a vision to 2030; the 'protection and development of coastal forests to cope with climate change during 2021–2025, with a vision to 2030' project; the scheme on conservation, exploitation and development of genetic resources of forest trees; National Biodiversity Conservation Planning for 2021–2030 with a vision to 2050; and the scheme on conservation, exploitation and development of forest genetic resources.
- Improve the capacity of the SUF and PTF systems, technical infrastructure, equipment for forest protection, and monitoring of forest resources; as well as the capacity of SUF and PTF management boards to meet requirements for SFM and the conservation of biodiversity and forest genetic resources, in line with international standards.

Making sure forest development is sustainable, through both effective planning and implementation, and sustainable forest exploitation and use. This will involve: (i) a review of land-use planning, including thoroughly resolving land disputes, planning intensive supply areas of raw materials and prioritizing large-scale, large-diameter timber plantations; (ii) ensuring stable development of the three different forest types; (iii) promoting and raising awareness of investment in forest development among forest owners and investors from different economic sectors, through a system of incentive policies on land, credit, tax and markets; (iv) improving the productivity, quality and efficiency of planted production forests to optimize both the production and value chain of forest products. This will involve the application of science and technology to determine: tree structure; plant species that are suitable for the specific land and climate conditions; species with high economic value; and species suited to diverse business and exploitation technologies. Science and technology will also be used so that advanced techniques can be applied, from using high quality seeds and intensive afforestation techniques, to mechanization and the use of advanced technology in all production stages. It will be necessary to: limit the exploitation of juvenile timber from young and growing planted forests; intensify planting of large-diameter timber forests; limit the exploitation of planted protection forests, to ensure their protection function and provide timber for processing; and zone off, improve and enrich natural forests that are classed as production forests, in order to improve their quality and create a large-scale, large-diameter timber supply after 2030. Forest ecosystem services like carbon sequestration will need to be maximized. It will be equally necessary to encourage organizations, households, individuals and communities to invest, manage, exploit and use forests according to the SFM plan, and to be granted forest certificates.

4 https://www.iucn.org/theme/protected-areas/our-work/iucn-green-list-protected-and-conserved-areas

It will be necessary to promote the cultivation and use of NTFPs, focusing on advantageous product groups like bamboo, rattan, medicinal herbs, oil and foodstuffs. This means that there will need to be a mechanism for forest owners to legally manage, exploit and use NTFPs. In addition, it is necessary to continue implementing projects and schemes like the 'Sustainable forest protection, restoration and development in the Central Highlands during 2016–2030' project (Decision No. 297/QD-TTg dated 18 March 2019); 'Sustainable forest management scheme and forest certification' (Decision No. 1288/QD-TTg dated 1 October 2018); 'Sustainable forest protection, restoration and development in the Northwest during 2021–2030' project; and the 'Protecting and developing coastal forests to respond to climate change during 2021–2025, with a vision to 2030' project. It is also vital to develop and implement new projects like 'Developing forest varieties during 2021–2030'; 'Developing centralized areas to supply the raw material needed for the forest product processing industry and trade' (Decision No. 1717/QD-BNN-TLCN dated 14 May 2019 promulgating the implementation plan of Directive 08/CT-TTg dated 28 March 2019); 'NTFP development'; 'Development strategy for forest ecosystem services'; 'Development strategy for large-scale, large-diameter timber forestations and the conversion of small-diameter timber plantations into large-diameter timber plantations'; and the 'Strategy for supporting households to effectively participate in the forest certification program'.

Boost development of the processing industry and forest product trade. Vietnam needs to be at the forefront of the production, processing and trade of forest products globally, through the formation of large corporations and industrial parks capable of technology, management and branding so as to join the global value chain. This will see Vietnam building Vietnamese brands and developing modern and online commerce expertise. The development of hi-tech forest product processing industrial parks, and industrial clusters of wood industries in places where a convenient supply of raw materials and infrastructure is present, will facilitate the development of forest product processing and trade. To succeed globally, Vietnam will need to innovate technology, support industry development, and focus on developing products which are sustainable and highly competitive. The forest product processing industry will need to be developed in association with the forestry sector, and be restructured toward substantial, modern, intelligent, efficient, value-added, safe and sustainable commodity production. All economic sectors will need to be encouraged to get involved; international investment and cooperation will likewise be required in the development of forest product processing industries and trade. Success on the global stage will involve Vietnam developing goods with high added value; increasing the amount of highly processed products; improving quality and diversifying the designs of processed products to match the preferences of domestic and foreign customers; building Vietnamese brands; and using legal, certified timber sources for export products and the domestic market. It will be necessary to gradually limit the export of wood chips, and expand the market in a way that ensures stable and sustainable development. Vietnam will need to pay attention to major markets such as the United States, the European Union, Japan, China, Korea and Australia, organizing the import of wood materials and forest products, and restricting the import of wooden furniture products that Vietnamese enterprises can produce. The effective implementation of FLEGT will also contribute to this goal.

Forestry development by region. The new strategy should outline forestry development goals and objectives by region, linking these with the 'National Forestry Development Plan for 2021–2030' to ensure consistency and feasibility across both national and regional goals. When outlining the new goals and objectives, the strategy needs to compare regional advantages in terms of land, climate and forest resources; attaching importance to specific characteristics of infrastructure, culture, society and development level. Forestry development should work towards economic efficiency, making sure commodity structures and production models are appropriate to optimize the value chain. It will be important to develop concentrated raw material supply forests in association with the processing industry; giving priority to the development of large-diameter timber forests, NTFPs and agroforestry. In the Northern Uplands and Central Highlands, special attention should be paid to the task of protecting, restoring and developing forests in a sustainable manner; as well as improving the

quality of existing forests, forest coverage should be increased as far as possible, to ensure watershed protection and biodiversity conservation in these regions. In the Northern Uplands, it is necessary to consider adjusting the provincial context to match nationwide zoning and planning.

Development of urban forestry and landscape afforestation. Development of urban forestry is an international trend, and countries in the region are integrating this field into their forestry strategies from 2020 onwards. In addition, ensuring a green, clean, beautiful and safe environment is key in countryside development (Decision 1980/QD-TTg dated 17 October 2016 of the Prime Minister promulgating the new countryside issues 2016–2020). Planting trees along roads and canals not only improves the landscape and environment, it also helps meet the wood demand for local people's daily lives, as well as providing raw materials for forest product processing. A mechanism and policy should be established to enable the implementation of urban forestry development programs, so as to effectively use green areas in the planning of urban areas, industrial parks and residential clusters. This will mean that planting trees in a reasonably structured manner, using advanced and modern techniques to meet requirements in terms of landscape, culture, aesthetics, environmental protection and economic value. There should be policies and financial mechanisms in place to improve and upgrade existing forests (protection forests, special-use forests and production forests) and develop green belts around the city and residential areas into protection forests that provide high-quality services to meet the requirements of environmental protection, health and leisure, and the growing needs of urban dwellers. Scattered tree planting also needs to be improved in scale, quality and efficiency, including the New Year tree planting festivals and social events, and resources need to be mobilized for awareness raising on the importance of trees and forestry.

Modernizing institutions, policies and planning and monitoring the sector. Vietnam is increasingly integrating itself internationally; rapid global change thus requires a change in national policy, including forestry policy. The 2017 Forestry Law should continue to be implemented as well as streamlined with other relevant laws and international regulations (e.g. on carbon rights, non-carbon benefits, NDC, CITES, CBD, REDD+, safeguards and VPA-FLEGT). New international market laws and trade patterns present significant challenges for Vietnam, particularly since its forestry sector, which is still operated by many state-owned enterprises, has not yet met these new requirements. There is also a significant gap between policy and practical implementation; law enforcement must still overcome obstacles in terms of benefit sharing, ensuring safety measures, and access to the emissions market and carbon markets, mobilizing capital, monitoring the effectiveness of law enforcement, and evaluating the effectiveness of policies. Efforts by the government and international community to formulate forestry policies have enabled more actors to participate in the policy process than before. Policy-making documents note that there is a need to promote the participation of civil society organizations (CSOs) and ethnic minority groups in decision-making. Like many other countries, addressing the causes of deforestation and forest degradation is a major challenge for Vietnam, especially when causes are associated with economic development. It is necessary to develop inter-agency coordination policy mechanisms to address this issue. Building a monitoring and evaluation system with an appropriate allocation of human and financial resources is also important so as to ensure effective policy implementation.

It is necessary to raise awareness and educate the whole of Vietnamese society about the role and importance of forests for sustainable development, national defense and security, and the country's environmental security. The general public also need a greater awareness of: the value of biodiversity and the significance of conserving rare genetic resources; the need to change the practice of using products originating from wild animals and plants; and the rights, obligations and social responsibilities of all stakeholders involved in forest protection, in the context of international integration and responding to climate change. Publicity, education and social awareness-raising work depend significantly on the programs and capacity of the media. However, Pham (2011) highlighted that this capacity and knowledge, particularly on climate change issues and the role of forests, are still very limited. Meanwhile, interviewees said that professionals in the forestry sector lack strong communication skills to be able to effectively convey forestry

issues, so awareness among other sectors, industry and the general public, is equally restricted. Additional training for journalists on the role of forests in climate change, and better coordination and knowledge sharing among stakeholders, will be the most important factor in improving the quality and quantity of information related to the forestry sector on mass media. It is also necessary to diversify training, for both state and non-state actors, on both technical and social competencies; encourage businesses and forest owners to get involved in research; and to link research with training and forestry extension services.

References

Green Anamite. 2020. *Preliminary report on current status assessment of wood processing industry in Vietnam, 2020.* USAID project.

[GoV] Government of Vietnam. 2019. *Report No. 476/BC-CP dated 11 October 2019 on the implementation of the Forest Protection and Development Plan for 2011–2020 according to the national target program mechanism*. Hanoi, Vietnam: GoV.

[GoV] Government of Vietnam. 2017. *Report No. 435/BC-CP dated 13 October 2017 of the Government on the results of forest protection, forest fire prevention and fighting in the period 2011–2016*. Hanoi, Vietnam: GoV.

[GoV] Government of Vietnam. 2011. *Report No. 128/BC-CP dated 9 August 2011 of the Government on the summary of implementation of the project 'New planting of 5 million hectares of forests' and the Plan of forest protection and development for 2011–2020*. Hanoi, Vietnam: GoV.

Hoang LS. 2020. *Evaluation the results of implementation of the Forest Products Processing and Trade Program.* Consultancy report. Hanoi, Vietnam: VNFOREST.

Le KC. 2010. National Forest Program Progress Assessment Report (Draft 2). http://vietnamforestry.org.vn/NewsFolder/NFPAssessmentReport_EN.pdf

Le ND, Loft L, Tjajadi JS, Pham TT and Wong GY. 2016. *Being equitable is not always fair: An assessment of PFES implementation in Dien Bien, Vietnam*. Working paper 205. Bogor, Indonesia: CIFOR.

[MARD] Ministry of Agriculture and Rural Development. 2020. *Conference report on solutions to restore processing and exporting wood and forest products on May 15, 2020*. Hanoi, Vietnam: MARD.

[MARD] Ministry of Agriculture and Rural Development. 2010. *Forest Sector Progress Report 2006–2010.* Preliminary report on 10-year implementation of PFES policy. Hanoi, Vietnam: MARD.

[MARD and VNFOREST] Ministry of Agriculture and Rural Development and the Viet Nam Administration of Forestry. 2011. *Vietnam's Forestry in the first decade of the 21st century.* Hanoi, Vietnam: Agriculture Publishing House.

Moeliono M, Pham TT, Le ND, Brockhaus M, Wong G, Kallio M and Nguyen DT. 2016. Local governance, social networks and REDD+: Lessons from swidden communities in Vietnam. *Human Ecology* 44(4): 435–448.

Nguyễn BN. 2019. *Vietnam's forestry in the reform period (1986–2018).* Consulting report IC.2019-03-02. Hanoi, Vietnam: UNDP.

Phạm TT and Lê TTT. 2020. *Integrating green carbon into country-determined contribution in 13 Asia-Pacific countries: Current situation, opportunities and challenges.* Info brief 275. Bogor, Indonesia: CIFOR.

Phạm TT, Đào TLC, Hoàng TL, Ngô HC, Hoàng TU, Trần NMH, Hoàng MH and Nguyễn VD. 2020a. *Prioritize investment and interest of parties in the area of forest protection and development activities in Vietnam period. 2011–2019.* Infobrief 44. Bogor, Indonesia: CIFOR. DOI: 10.17528/cifor/007567

Phạm TT, Hoàng TL, Nguyễn DT, Đào TLC, Ngô HC and Phạm VH. 2020b. The context for REDD+ in Vietnam: Drivers, agents and institutions. 2nd edition. Thematic report 203. Bogor, Indonesia: CIFOR.

Phạm TT, Ngô HC, Hoàng MH, Williams P, Hoàng TL and Đào TLC. 2020c. World forestry development strategies and policies. Thematic report 262. Bogor, Indonesia: CIFOR

Phạm TT, Ngô HC and Nông NKN. 2019. 10 *Trends in world forestry Vietnam should be considered during the development of the Forestry Development Strategy for the period 2020–2030.* Thematic report 256. Bogor, Indonesia: CIFOR.

Phạm TT, Hoàng TL, Nguyễn ĐT, Lê HN, and Stibniati A. 2019a. *Funding sources for mangrove protection and development at the grassroots level: Lessons from Ben Tre, Tra Vinh and Ca Mau Provinces, Vietnam*. Info brief 251. Bogor, Indonesia: CIFOR.

Phạm TT, Nguyễn ĐT, Đào TLC and Hoàng TL. 2019b. *Prepare Vietnam for the new rules of the international market – production and business that is not related to deforestation and forest degradation.* Thematic report 253. Bogor, Indonesia: CIFOR.

Pham TT, Vu TP, Pham DC, Dao LHT, Nguyen VT, Hoang NVH, Hoang TL, Dao TLC and Nguyen DT. 2019c. *Opportunities and challenges for mangrove management in Vietnam: Lessons learned from Thai Binh, Quang Ninh and Thanh Hoa provinces*. Occasional paper 197. Bogor, Indonesia: CIFOR.

Phạm TT, Bùi TMN, Phạm HL, Nguyễn VD, Đào TLC and Hoàng TL. 2018a. *The potential of REDD+ to contribute financially to the forestry sector in Vietnam.* Info brief 232. Bogor, Indonesia: CIFOR.

Phạm TT, Bùi TMN, Phạm HL, Nguyễn VD, Đào TLC and Hoàng TL. 2018b. *The role of payment for forest environmental services in financial support for the forest sector in Vietnam.* Info brief 228. Bogor, Indonesia: CIFOR.

Phạm TT, Đào TLC, Hoàng TL, Bùi TMN, Phạm HL and Nguyễn VD. 2018c. *Opportunities and challenges in financial mobilization for the implementation of the Vietnam Forestry Development Strategy in the period 2006–2020.* Occasional paper 191. Bogor, Indonesia: CIFOR.

Phạm TT, Đào TLC, Hoàng TL, Nguyễn ĐT, Lê MT, Nông HH and Đặng TN. 2018d. *Impact of payments for forest environmental services (PFES) in Son La, Vietnam: From hypothesis to reality.* Thematic report 188. Bogor, Indonesia: CIFOR.

Phạm TT, Vũ TP, Vũ TH, Lương TT, Lê ND and Đào TLC. 2017. *Opportunities and challenges for forest pricing in Vietnam – Stakeholders' perspectives.* Thematic report 191. Bogor, Indonesia: CIFOR.

Pham TT, Le ND, Vu TP, Nguyen HT and Nguyen VT. 2016a. *Forest land allocation and payments for forest environmental services in four northwestern provinces of Vietnam: From policy to practice.* Occasional paper 155. Bogor, Indonesia: CIFOR.

Pham TT, Mai YH, Moeliono M and Brockhaus M. 2016b. Women's participation in REDD+ national decision-making in Vietnam. *International Forestry Review* 20(10).

Pham TT and Brockhaus M. 2015. *Gender mainstreaming in REDD+ and PES – Lessons learned from Vietnam*. Gender Climate brief 5. Bogor, Indonesia: CIFOR.

Phạm TT, Bennett K, Vũ TP, Brunner J, Lê ND and Nguyễn ĐT. 2013. *Payment for forest environmental services in Vietnam: From policy to practice.* Thematic report 98. Bogor, Indonesia: CIFOR.

Phạm TT, Moeliono M, Nguyễn TH, Nguyễn HT and Vũ TH. 2012. *The context of REDD+ in Vietnam. Causes, objects and institutions.* Thematic report 77. Bogor, Indonesia: CIFOR

Phạm TT. 2011. *The issue of REDD+ policy is reflected in the mass media: A case study in Vietnam.* Thematic report 83. Bogor, Indonesia: CIFOR.

Pham TT, Garnet ST and Aslin HJ. 2011. Organisational and Institutional Opportunities and Constraints for Poor Households to Participate in Payment for Environmental Service Schemes in Vietnam. *The Asia Pacific Journal of Public Administration* 33(1):57–76.

Pham TT, Campbell BM, Garnett ST, Aslin H and Hoang MH. 2010. Importance and impacts of intermediary boundary organizations in facilitating payment for environmental services in Vietnam. *Environmental Conservation* 37: 64–72.

Phương VT, Phạm TT, Lê ND and Đào TLC. 2017. *International experience and recommendations for revision of the legal framework for forest pricing in Vietnam.* Thematic report 168. Bogor, Indonesia: CIFOR.

Tran ĐN. 2020. *Assessment report on the implementation results of the program on forestry policy, institutions, planning and monitoring.* Consultancy report. Hanoi, Vietnam: VNFOREST.

Tran TTH. 2020. *Assessment report on the implementation result the program on research, education, training and forestry extension.* Consultancy report. Hanoi, Vietnam: VNFOREST.

VNFOREST. 2020a. *Vietnam forestry 75 years of establishment and development (1945–2020).* Hanoi, Vietnam: Agricultural Publishing House.

VNFOREST. 2020b. *Results of the implementation of the Vietnam Forestry Research Strategy for the period 2008–2020 and orientations for Vietnam's forestry research in the period of 2021–2030.* Proceedings of the Forestry Science Research and Technology Transfer Conference: Achievements and Development Directions.

Vũ TD. 2020. *Assessment report on Sustainable Forest Management and Development program 2006–2020.* Consulting report. Hanoi, Vietnam: VNFOREST.

Yang AL, Pham TT, Dieu H, Wong G, Le ND, Tjajadi JS and Loft L. 2015. *Lesson from the perception of equality and riches in payment for forest environmental services (FPES) fund distribution: A case study of Dien Bien and Son La province in Vietnam.* Bogor, Indonesia: CIFOR.

Appendix 1. List of forestry policies and laws made during 2006–2020

No.	Policy/law
I	**Forest development policies associated with poverty alleviation and support for ethnic minorities**
1	Resolution No. 30a/2008/NQ-CP dated 27 December 2008 of the Government on the program to support rapid and sustainable poverty reduction for 61 poor districts
2	Decree No. 75/2015/ND-CP dated 9 September 2015 of the Government on forest protection and development policies associated with sustainable poverty reduction policies and supporting ethnic minority people
3	Decision No. 2621/QD-TTg dated 31 December 2013 of the Prime Minister amending and supplementing a number of levels of production development support specified in Resolution No. 30a/2008/NQ-CP dated 27 December 2008 by the Government
4	Joint Circular No. 93/2016/TTLT-BTC-BNNPTNT dated 27 June 2016 of the Ministry of Finance and the Ministry of Agriculture and Rural Development guiding the management and use of non-business funding for the implementation of Decree No. 75/2015/ND-CP
II	**Policies on investment in and development of special-use and protection forests**
5	Decree No. 117/2010/ND-CP dated 24 December 2010 of the Government on the organization and management of special-use forests
6	Decision No. 24/2012/QD-TTg dated 1 June 2012 of the Prime Minister on policy on investment in the development of special-use forests during 2011–2020
7	Decision No. 17/2015/QD-TTg dated 9 June 2015 of the Prime Minister promulgating the Regulation on protection forest management
8	Joint Circular No. 100/2013/TTLT-BTC-BNNPTNT dated 26 July 2013 of the Ministry of Finance and the Ministry of Agriculture and Rural Development, guiding the implementation of a number of articles of Decision 24/2012/QD-TTg dated 1 June 2012 of the Prime Minister, on policies for the investment and development of special-use forests during 2011–2020
III	**Production forest development policies**
9	Decree No. 119/2016/ND-CP dated 23 August 2016 of the Government on a number of policies connected to the sustainable management, protection and development of coastal forests in response to climate change
10	Decision No. 38/2016/QD-TTg dated 14 September 2016 of the Prime Minister promulgating a number of policies on forest protection and development, investment in supporting infrastructure and assigning tasks to agro-forestry companies
11	Decision No. 49/2016/QD-TTg dated 1 November 2016 of the Prime Minister promulgating the Regulation on the management of production forests
12	Directive No. 02/CT-TTg dated 24 January 2014 of the Prime Minister on strengthening the direction of reforestation to replace forest areas for other purposes
13	Circular No. 23/2013/TT-BNNPTNT dated 4 May 2013 of MARD on regulating the improvement of poor-quality natural forests that are production forests
14	Circular No. 24/2013/TT-BNNPTNT dated 6 May 2013 of the Ministry of Agriculture and Rural Development providing for replacement afforestation when changing forest use to other purposes

No.	Policy/law
15	Circular No. 26/2015/TT-BNNPTNT dated 29 July 2015 of the Ministry of Agriculture and Rural Development amending and supplementing a number of articles of the Circular No. 24/2013/TT-BNNPTNT dated 6 May 2013 of the Ministry of Agriculture and Rural Development, providing for replacement afforestation when changing forest use to other purposes
IV	**Policies on payment for forest environmental services**
16	Decree No. 99/2010/ND-CP dated 24 September 2010 of the Government on the policy of payment for forest environmental services
17	Decree No. 147/2016/ND-CP dated 2 November 2016 of the Government amending and supplementing a number of articles of the Government's Decree No. 99/2010/ND-CP dated 24 September 2010 on payment for forest environmental services
18	Joint Circular No. 62/2012/TTLT-BNNPTNT-BTC dated 16 November 2012 of the Ministry of Agriculture and Rural Development and Ministry of Finance, guiding the management and use of payments for forest environmental services
V	**Forest management and protection policies**
19	Directive No. 13-CT/TW dated 12 January 2017 of the Secretariat on strengthening the Party's leadership in forest management, protection and development
20	Decree No. 157/2013/ND-CP dated 11 November 2013 of the Government stipulating the sanction of administrative violations in forest management, forest development, forest protection and forest product management
21	Decree No. 40/2015/ND-CP dated 27 April 2015 of the Government amending and supplementing a number of articles of the Government's Decree No. 157/2013/ND-CP dated 11 November 2013, providing for sanctions in relation to administrative violations on forest management, forest development, forest protection and forest product management
22	Decree No. 168/2016/ND-CP dated 27 December 2016 of the Government regulating the contracting of forests, gardens and water surface areas in the management boards of special-use forests, protection forests and state agro-forestry enterprises
23	Decision No. 07/2012/QD-TTg dated 8 February 2012 of the Prime Minister promulgating a number of policies to strengthen forest protection
24	Decision No. 44/2016/QD-TTg dated 19 October 2016 of the Prime Minister, on the regulations on the power and organizational structure of forest rangers
25	Directive No. 1685/2011/CT-TTg dated 27 September 2011 of the Prime Minister with the primary goal to "strengthen the directions for implementing forest protection measures, preventing deforestation and resistance against law enforcement due to rubber expansion".
VI	**Policies to encourage investment in forestry**
26	Decree No. 210/2013/ND-CP dated 19 December 2013 of the Government on policies to encourage enterprises to invest in agriculture and rural areas
27	Decree No. 57/2018/ND-CP dated 17 April 2018 of the Government on policies to encourage enterprises to invest in agriculture and rural areas
28	Decree No. 55/2015/ND-CP dated 9 June 2015 of the Government on credit policy for agricultural and rural development
29	Decree No. 02/2017/ND-CP on mechanisms and policies to support agricultural production to restore production in areas damaged by natural disasters and epidemics; including the forestry sector
VII	**Agro-forestry company renovation policies**
30	Resolution No. 30-NQ/TW dated 12 March 2014 of the Politburo of the Central Committee of the Communist Party of Vietnam on continuing to organize, modernize, develop and improve the operational efficiency of agricultural and forestry companies
31	Decree No. 118/2014/ND-CP dated 17 December 2014 of the Government on the organization, modernization, development and improvement of the operational efficiency of agricultural and forestry companies

No.	Policy/law
32	Circular No. 02/2015/TT-BNNPTNT dated 27 January 2015 of the Ministry of Agriculture and Rural Development guiding the development of overall projects and plans on the organization and modernization of agricultural and forestry companies according to Decree No. 118/2014/ND-CP dated 17 December 2014 of the Government on reorganizing, modernizing, developing and improving the operational efficiency of agricultural and forestry companies
VIII	**Natural forest management policies**
33	Decision No. 2242/QD-TTg dated 11 December 2014 of the Prime Minister approving the strategy to strengthening the management of logging in natural forests during 2014–2020
34	Circular No. 24/2016/TT-BNNPTNT dated 30 June 2016 of the Ministry of Agriculture and Rural Development issuing the list and announcing the harmonizing system (HS) codes for goods banned from export, including logs and sawn timber of all kinds from natural forest wood; domestic and exported goods under license include firewood, wood charcoal and firewood originating from domestic natural forest wood
35	Circular No. 330/2016/TT-BTC guiding the estimation, allocation, payment and settlement of support funds from the state budget to protect the natural forest areas of forestry companies that must be suspended according to Decision No. 2242/QD-TTg dated 11 December 2014 of the Prime Minister
IX	**Biodiversity conservation policies**
36	Circular No. 90/2008/TT-BNN dated 28 August 2008 of the Ministry of Agriculture and Rural Development guiding the handling of forest animals after confiscation
37	Decision No. 95/2008/QD-BNN dated 29 September 2008 of the Ministry of Agriculture and Rural Development promulgating the Regulation on management of farm bears
38	Decree No. 06/2019/ND-CP of the Government on management of endangered, precious and rare forest flora and fauna and implementation of the Convention on International Trade in Endangered Species of wild fauna and flora (CITES) (replacing Decree 95/2008/QD-BNN)
39	Decree No. 99/2009/ND-CP of the Government on the sanctioning of administrative violations in the areas of forest management, forest protection and management of forest products
40	Decree No. 35/2019/ND-CP on the sanctioning of administrative violations in the forestry sector (replacing Decree 99/2009/ND-CP)
41	Circular No. 59/2010/TT-BNNPTNT dated 19 October 2010 of the Ministry of Agriculture and Rural Development promulgating the list of wild fauna and flora species under the Convention on International Trade in Endangered Species (CITES)
42	Circular No. 04/2017/TT-BNNPTNT on the promulgation of the list of wild fauna and flora species specified in the annexes to the Convention on International Trade in Endangered Species of wild fauna and flora (CITES) (replacing Circular No. 59/2010/TT-BNNPTNT)
43	Circular No. 35/2011/TT-BNN dated 20 May 2011 issued by the Ministry of Agriculture and Rural Development guiding the exploitation and reclamation of timber and non-timber forest products
44	Circular No. 27/2018/TT-BNNPTNT regulating the management and traceability of forest products (replacing Circular 35/2011/TT-BNN)
45	Decision No. 11/2011/QD-TTg dated 18 February 2011 of the Prime Minister on policies to encourage the development of the bamboo and rattan industries
46	Circular No. 01/2012/TT-BNN dated 4 January 2012 of the Ministry of Agriculture and Rural Development providing for legal records of forest products and checking the origin of forest products
47	Circular No. 42/2012/TT-BNNPTNT dated 21 August 2012 of the Ministry of Agriculture and Rural Development amending and supplementing a number of articles of Circular No. 01/2012/TT-BNNPTNT providing for legal records of forest products and inspection checks on the origin of forest products
48	Circular No. 47/2012/TT-BNNPTNT dated 25 September 2012 on regulating the management of exploitation of wild and common forest animals
49	Circular No. 27/2018/TT-BNPTNT on the management and traceability of forest products (replacing Circular 47/2012/TT-BNNPTNT)

No.	Policy/law
50	Decision No. 39/2012/QD-TTg dated 5 October 2012 of the Prime Minister on regulating the management of ornamental plants, shade trees and ancient trees
51	Decision No. 11/2013/QD-TTg dated 24 January 2013 of the Prime Minister on prohibiting the export, import and sale of specimens of certain wild animals in the Annexes to the Convention on International Trade of Endangered Species of wild fauna and flora (CITES)
52	Decision No. 176/QD-TTg dated 30 October 2013 of the Prime Minister approving the medicinal plant development strategy until 2020 and strategic vision to 2030
53	Decree No. 65/2017/ND-CP dated 19 May 2017 of the Government promulgating specific policies on species, capital and technology in the development of cultivating and exploiting medicinal herbs
X	**Other issues**
54	Joint Circular No. 07/2011/TTLT-BNNPTNT-BTNMT dated 29 January 2011 of the Ministry of Agriculture and Rural Development and the Ministry of Natural Resources and Environment, guiding a number of issues relating to forest allocation and forest lease, connected to land allocation and renting forest land
55	Circular No. 172/2011/TT-BTC dated 1 December 2011 of the Ministry of Finance regulating the management, payment and settlement of investment capital for construction of silviculture works funded by the state budget
56	Circular No. 51/2012/TT-BNN dated 19 October 2012 of the Ministry of Agriculture and Rural Development guiding the implementation of forest protection and development tasks specified in Decision No. 57/QD-TTg dated 9 January 2012 of the Prime Minister
57	Circular No. 18/2013/TT-BTC dated 20 February 2013 of the Ministry of Finance guiding the order and procedures for the liquidation of planted forests and management and use of proceeds from the liquidation of non-planted forests
58	Joint Circular No. 10/2013/TTLT-BNNPTNT-BTC dated 1 February 2013 of the Ministry of Agriculture and Rural Development and the Ministry of Finance guiding the management and use of investment capital from the state budget for implementation during 2011–2020, according to Decision No. 57/QD-TTg dated 9 January 2012 of the Prime Minister
59	Joint Circular No. 80/2013/TTLT-BTC-BNN dated 14 June 2013 of the Ministry of Finance and Ministry of Agriculture and Rural Development guiding the management and use of non-business funding for forest protection and development
60	Joint Circular No. 20/2013/TTLT-BNNPTNT-BTC dated 27 March 2013 of MARD and the Ministry of Finance, amending and supplementing a number of articles in Joint Circular No. 61/2007/TTLT-BNN-BTC dated 22 June 2007 of the MARD and the Ministry of Finance, guiding the management mechanism and use of state budget funds allocated for the operation of forest protection agencies at all levels, and payment of expenses for organizations and individuals mobilized to prevent illegal deforestation, and forest fire prevention and fighting
61	Circular No. 38/2014/TT-BNNPTNT dated 3 November 2014 of the Ministry of Agriculture and Rural Development guiding the sustainable forest management plan
62	Circular No. 40/2015/TT-BNNPTNT dated 21 October 2015 amending and supplementing a number of articles of Circular No. 01/2012/TT-BNNPTNT dated 4 January 2012 of the Ministry of Agriculture and Rural Development on legal forest product records and checking the origin of forest products
63	Circular No. 44/2015/TT-BNNPTNT dated 23 November 2015 of the Ministry of Agriculture and Rural Development promulgating the list of major forest plant varieties
64	Circular No. 21/2016/TT-BNNPTNT dated 28 June 2016 of the Ministry of Agriculture and Rural Development providing for the main exploitation, utilization and salvage of forest products
65	Circular No. 23/2016/TT-BNNPTNT dated 30 June 2016 of the Ministry of Agriculture and Rural Development guiding a number of issues on the management of silvicultural work
XI	**Documents guiding implementation of the Forest Law**
66	Decree No. 156/2018/ND-CP dated 16 November 2018 of the Government guiding the implementation of a number of articles of the 2017 Forestry Law
67	Decree No. 01/2019/ND-CP dated 1 January 2019 of the Government on forest rangers and specific forest protection units established and managed by different forest owners

No.	Policy/law
68	Decree No. 06/2019/ND-CP dated 22 January 2019 of the Government on the management of endangered, precious and rare forest flora and fauna and implementation of the Convention on International Trade in Endangered Species (CITES)
69	Decree No. 35/2019/ND-CP dated 25 April 2019 of the Government providing for administrative sanctions in the forestry sector
70	Circular No. 27/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development providing for the management and traceability of forest products
71	Circular No. 28/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development on sustainable forest management
72	Circular No. 29/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development regulating silvicultural measures
73	Circular No. 30/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development regulating the list of main forest plant species; seed recognition and breed source; and material management for major forestry trees
74	Circular No. 31/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development regulating the delimitation of forest boundaries
75	Circular No. 32/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development regulating methods of forest valuation and forest price brackets
76	Circular No. 33/2018/TT-BNNPTNT dated 16 November 2018 of the Ministry of Agriculture and Rural Development regulating forest investigation, inventory and monitoring
77	Circular No. 12/2019/TT-BNNPTNT dated 25 October 2019 of the Ministry of Agriculture and Rural Development regulating statistical work in the forestry sector
78	Circular No. 13/2019/TT-BNNPTNT dated 25 October 2019 of the Ministry of Agriculture and Rural Development providing for replacement afforestation when changing forest use to other purposes
79	Circular No. 15/2019/TT-BNNPTNT dated 30 October 2019 of the Ministry of Agriculture and Rural Development guiding a number of issues on the management of silvicultural work
80	Circular No. 25/2019/TT-BNNPTNT dated 27 December 2019 of the Ministry of Agriculture and Rural Development guiding the implementation of regimes and policies for participants in forest fire prevention and fighting

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The Vietnam Forestry Development Strategy (VFDS) is one of the country's most important plans for the forestry sector. The strategic directions, objectives and solutions within it differ from time to time, depending on the political goals and perspectives of the moment, as well as the role that the forestry sector plays in Vietnam's overall socio-economic development.

Regardless of such changes, inheriting lessons learned, developing the next strategy off the back of the experience gained from solving previous challenges, and taking advantage of opportunities, are always the top priorities of the Government of Vietnam. This report is the result of a collaboration between the Center for International Forestry Research (CIFOR) and the Vietnam Administration of Forestry (VNFOREST); it is intended to provide VNFOREST with input as they develop the new strategy. Based on secondary document research and stakeholder interviews, the report reviews achievements and challenges in the implementation of VFDS 2006–2020, as well as provides recommendations for policy makers to consider in the process of developing the new strategy.

Research results show that, by 2020, Vietnam had exceeded a number of the goals set out in VFDS 2006–2020, including: (i) accelerating the growth of production value in the sector; (ii) increasing the export value of wood and forest products; (iii) increasing domestic wood production; and (iv) planting protection forest (PTF) and special-use forests (SUF). However, the forestry sector still faces many challenges when it comes to other key performance indicators, such as: (i) increasing the area of production forests (PDF) with certification of sustainable forest management (SFM); (ii) increasing large-diameter timber production; (iii) increasing revenue for forest environmental services (FES); (iv) securing forest and forest land for the purposes of allocation and leases; (v) reducing the number of poor households in forestry areas; and (vi) increasing the rate at which forestry workers are trained.

Although some anticipated targets were not achieved, others were exceeded, for example: forest cover; reforestation after logging; reduction of forest protection violations; and scattered tree planting. That these goals were achieved or exceeded is the result of strong political commitment, policies trend-matching the market, improvements in central and local management capacity, the active support of international donors, and the involvement of civil society and the private sector. That some targets were not achieved is due to the challenges of implementing policy effectively, efficiently and equitably at grassroots level, lack of resources and funding, and some ambitious goals and targets not being realistic in the current economic, political and market contexts.

Addressing these challenges requires a new approach and more effective economic, social and technical solutions. Development of VFDS 2021–2030 and the 2050 vision needs to consider the implementation achievements and challenges of the previous policy, as well as how to align with global trends, and balance these with the current political, economic and social development context in Vietnam. The direction of the new strategy must also be considered in the context of international requirements, to facilitate the mobilization of domestic and foreign financial resources to help modernize the industry, as well as enhance the forestry sector's role and value in terms of poverty reduction, sustainable economic development and ensuring sustainable forest ecosystems.

CGIAR RESEARCH PROGRAM ON Forests, Trees and Agroforestry

This research was carried out by CIFOR as part of the CGIAR Research Program on Forests, Trees and Agroforestry (FTA). FTA is the world's largest research for development program to enhance the role of forests, trees and agroforestry in sustainable development and food security and to address climate change. CIFOR leads FTA in partnership with Bioversity International, CATIE, CIRAD, INBAR, ICRAF and TBI.

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