



Fighting fires in Viet Nam. Photo: Department of Forest Protection

## The decreasing trend of forest fires in Viet Nam and lessons learned

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***“As a result of effective policies, Viet Nam has reversed the trend that has seen increases in the frequency and intensity of forest fires around the world.”***

### Introduction

A wide range of climates and a complex topography shape Viet Nam and its diverse forest ecosystems. These include tropical forests, deciduous dipterocarp forests, pine forests, peat swamp forests, degraded forests and plantations. Forests today cover 42% of the country, but this was not always the case. Forest cover fell from 43% in 1945 to 27% in 1990 (de Jong et al. 2006), when the remaining natural forests were so significantly degraded that many state forest enterprises had no more timber to harvest (Phúc and Nghi 2014).

Before 1975, during the years of civil war, forests were overexploited for timber that was exported as a source of revenue (Phúc and Nghi 2014), and many forest fires were caused by aerial bombardment and intentional burning (Chandler and Bentley 1970). Migration to mountainous areas was common until the 1990s (Marx and Fleischer 2010), when fire was often used



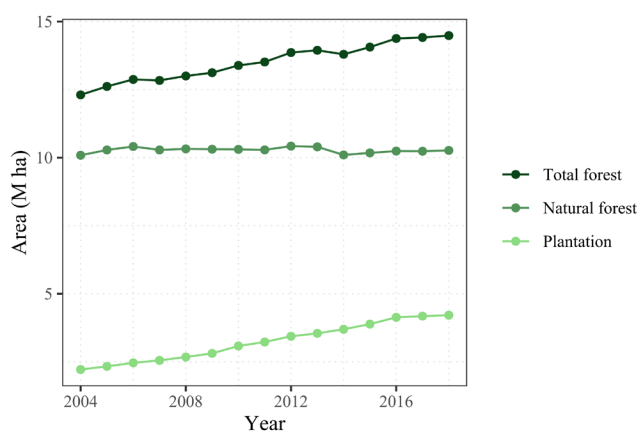
More than four million hectares of plantations have been established in Viet Nam, commonly using exotic acacia species. Photo: Tran Lam Dong

to clear land for agriculture and in shifting cultivation (Westing 1983; Truyên 2007). Such practices remained widespread among many ethnic minorities in the Central Highlands and the northwest until the 2000s (Hai et al. 2009; Quê et al. 2009).

Although wildfires have been a recurring problem, the total number of fires and the annual of burned areas have both been declining in the past two decades. This article outlines the government policies and other factors and their respective roles in explaining the decrease in forest fires and the lessons learned from forest fire prevention and firefighting in Viet Nam. To put these policies into local contexts regarding fire trends, capacities and gaps, a survey of 28 staff members involved in fire prevention and firefighting from 28 organizations was undertaken. The survey information is reported for the first time in this article.

### National trends in forest expansion and fire reduction

In 1990, the national government responded to the alarming trend of forest degradation. By 2020, after 30 years forest cover had increased to 42%. This comprised 10,279,185 hectares (ha) of natural forests and 4,398,030 ha of plantations (Decision No. 1558/QĐ-BNN-TCLN); most of the expansion is due to the doubling of the area of plantations (Figure 1).



**Figure 1: Forest area in Viet Nam (2004–18).**  
Source: Ministry of Agriculture and Rural Development (MARD).

The 1991 *Forest Resources Protection and Development Act* divided forests into three types — special-use, protection and production forests — and required the management and protection of each type to comply with specific regulations. This classification supports effective forest management while also ensuring forest conservation and economic development:

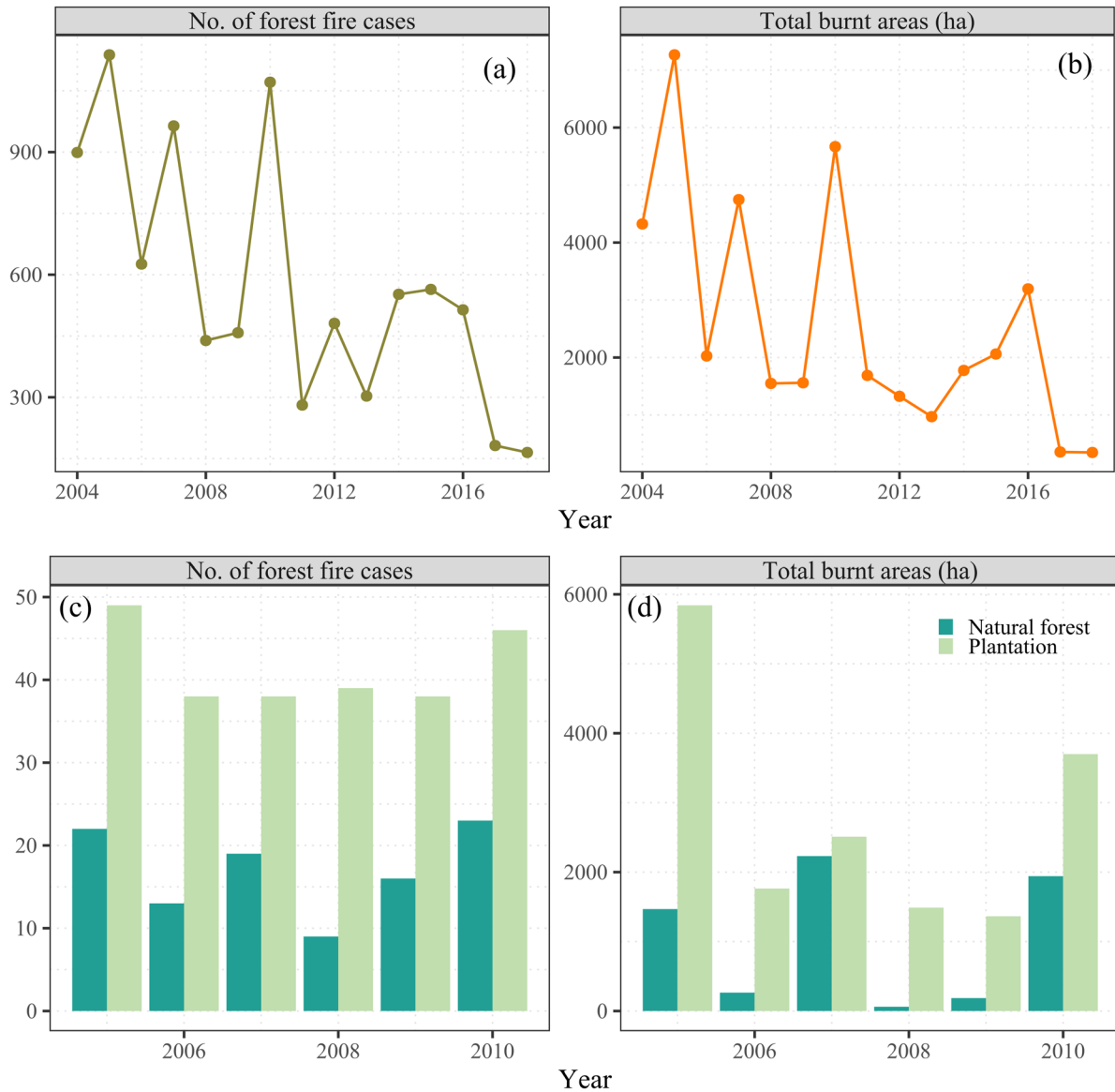
1. Special-use forests are managed mainly for the conservation of nature, biodiversity and genetic resources, for the preservation of historical and cultural relics, and for scientific research.
2. Protection forests protect water sources, reduce soil erosion, reduce desertification, reduce impacts

from natural disasters, and help to regulate the climate, etc.

- Production forests aim at the production of timber and non-timber forest products, and their subsequent processing and trade.

Since 2004, an average of 3,803 ha of forests have burned each year: 1,025 ha of natural forests, and 2,777 ha of plantations. The annual number of fires and size

of burned areas have fluctuated considerably, but both show an overall decreasing trend (Figure 2a and 2b). Disaggregated data for the period between 2005 and 2010 (Figure 2c and 2d) confirm that fires are much more common in plantations than in natural forests. The forest fire season is December to May in most ecological regions, and from March to September in the north central and south central coast regions (MARD 2007).



**Figure 2: The number of fires and area burned annually, as national totals between 2004 and 2018 (a and b), and between natural forests and plantations between 2004 and 2010 (c and d). Source: Viet Nam Forest Protection Department**



Degraded tropical forests are especially vulnerable to fire in the dry season. Photo: Ninh Viet Khuong

### The role of government policies since 1990

Recognizing and responding to forest degradation, the national government issued nearly 150 policies related to forest protection and development between 1990 and 2001 (Sam and Trung 2003). The most important ones were the *Law on Forest Protection and Development* in 1991 (No. 58-LCT/HĐNN8), and the 1993 *Law on Land* (No. 24-L/CTN), which supported land allocation to various entities in the subsequent two decades. In 1998, the government began a programme to reforest five million hectares (No. 661/QĐ-TTg) which built the foundation for the development of plantations in Viet Nam.

Other policies in the 1990s and 2000s were issued to support the resettlement and economic development of poor ethnic minority people (e.g., Decrees No. 135/1998/QĐ-TTg, No. 134/2004/QĐ-TTg, and No. 33/2007/QĐ-TTg). These policies improved livelihoods and markedly reduced negative impacts on forests, including forest fires (Tinh and Nghi 2012).

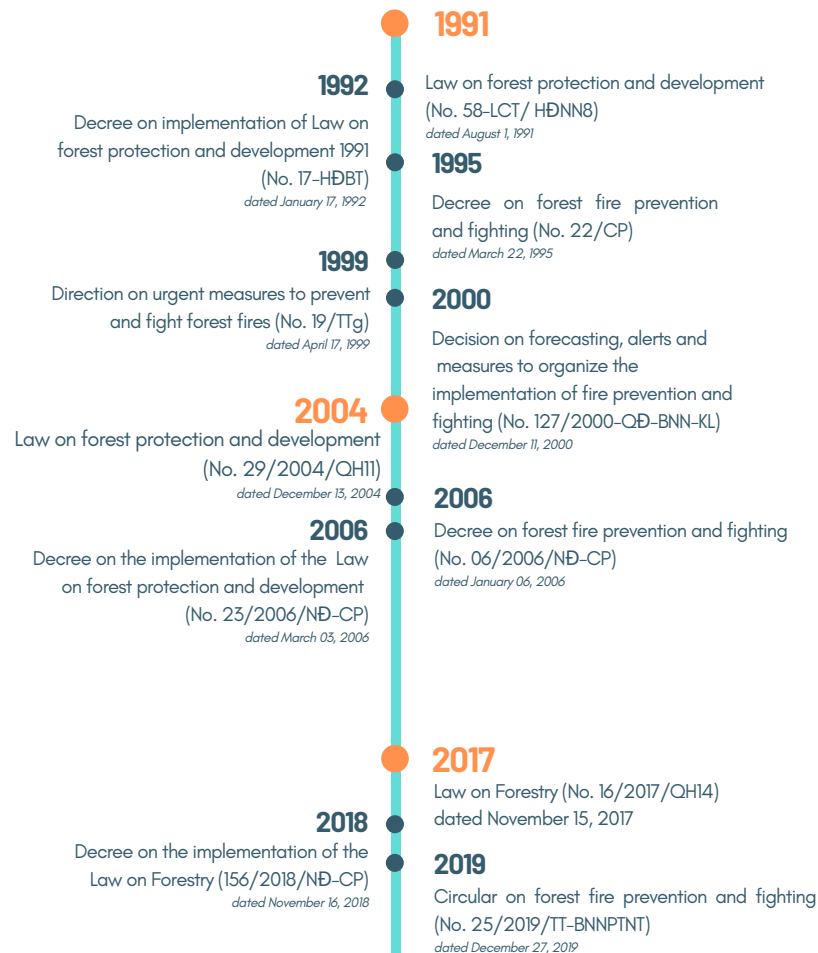
The 1991 *Forest Resources Protection and Development Act* prohibited burning on forested land, and specified that state agencies were responsible for formulating and directing the implementation of plans for forest fire prevention and firefighting. Responsibility later shifted to all forest owners, including individuals and local communities, following the 2004 *Forest Protection and Development Law* (Decree No. 29/2004/QH11); this was further refined in 2006 through Decree No. 09/2006/ND-CP and through the 2017 *Law on Forestry* (Decree

No. 16/2017/QH14). These laws also specified the forest protection responsibilities of ministries and ministerial-level agencies. Sanctions for violence in forest protection and forest fires have been specified in the Criminal Code (Decree No. 15/1999/QH10) since 1999.

The 2004 *Forest Protection and Development Law* was particularly important in defining the role of forest ranger forces (which were first established in 1973 under Decree No. 101-CP). These specialized units are responsible for developing forest fire prevention and firefighting programmes and plans, forecasting and early warning, and training forest owners in developing and implementing plans for forest fire prevention and firefighting. The 2004 law also provided the legal basis for payment for forest environmental services (Thuy et al. 2013), which has significantly contributed to forest protection and fire prevention. By 2020, payments were received for 6.7 million ha of forests (VNFF 2021).

The *Law on Forestry* in 2017 (further clarified in Decree No. 156/2018/ND-CP) regulated the use of fire in and near forests, as well as fire prevention and firefighting, stipulating responsibilities for developing fire prevention and firefighting plans. The law also regulated the valuation of compensation when forest fire occur, and the forest fire prevention and firefighting policies related to investments in resources, equipment, monitoring and early warning systems. Circular No. 25/2019/TT-BNNPTNT also specified the need for training in forest fire prevention and firefighting. See Figure 3.

## FOREST FIRE-RELATED POLICIES



**Figure 3: Major policies in Viet Nam related to forest fires, 1991–2019**

The national government has also promoted sustainable forest management and livelihood development initiatives for local people. The country is a signatory to international treaties such as the United Nations Framework Convention on Climate Change (MoNRE 2020), and also introduced REDD+ to Viet Nam. This helped to raise awareness of the need to protect forests, reduce deforestation and prevent forest fires. In addition, sustainable forest management and forest certification schemes, in which there is no burning, have been applied on more than 300,000 ha (Vietnam Administration of Forestry 2021), mainly in plantations.

### Forest fire prevention and firefighting

In order to understand local perceptions of forest fires, an online survey of 28 staff members was undertaken in January 2022, mostly technical experts, from 28 forest management organizations across Viet Nam. The

questionnaires were developed by the authors and shared publicly. They were designed to collect information on six topics:

1. forest fire prevention and firefighting experiences;
2. technologies and tools used;
3. capacities and training;
4. experiences of the organization in preventing and fighting forest fires;
5. understanding of related regulations and policies; and
6. the forest management resources of the organization.

The participating organizations were from the Northwest (Hoa Binh, Lai Chau, Son La), Northeast (Ha Giang, Phu Tho, Lao Cai, Thai Nguyen), North Central Region (Thanh Hoa, Nghe An, Thua Thien Hue, Quang Tri), South Central Coast (Quang Nam, Quang Ngai, Binh Dinh, Ninh Thuan,

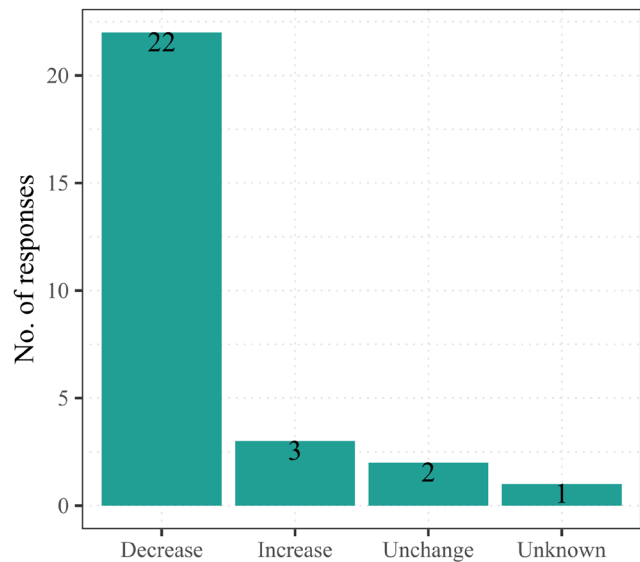


Burning residues after harvesting in plantations. Photo: Tran Lam Dong

Binh Thuan), Central Highlands (Dak Nong, Lam Dong), and Southeast (Ba Ria – Vung Tau). They included sub-departments of forest protection bodies, management boards of protected areas, and forest rangers at the commune level.

Nearly 60% of the survey respondents reported forest fires in their jurisdictions every year; 36% said that burning occurred every few years. However, the majority of respondents (85%) believed that the frequency of forest fires had been decreasing or had not changed in the previous 10 years (Figure 4). They largely saw this trend as the result of new policies that have led to increased local awareness of the risks of fire and to improved forest management. Only three respondents (10%) stated that forest fires had increased, due to climate change, the spread of unintentional fires, and conflicts. Most burned forests occur in acacia and pine plantations, and in natural deciduous dipterocarp forests, regenerated and degraded forests, and grasslands.

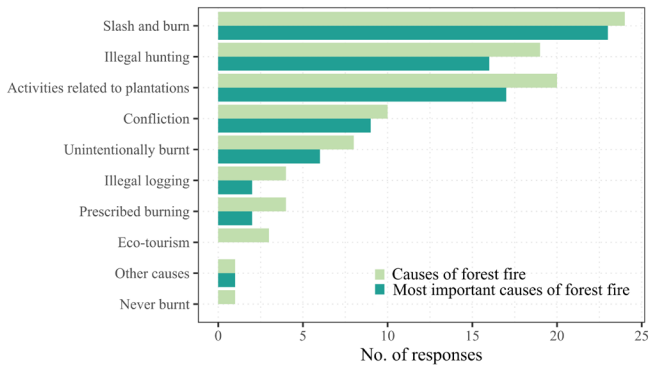
Most forest fires in Viet Nam are caused by human activities, both intentional or unintentional. The three most important causes indicated by survey respondents were 1) slash-and-burn (shifting) cultivation and 2) illegal hunting (including honey collection), which usually occur in natural forests, and 3) activities related to plantations (Figure 5), where burning residues after harvesting is the main cause of forest fires. In addition, participants regarded conflict as an important cause of forest fires, particularly in plantations. Unintentional burning was



**Figure 4: Perceived trends in the occurrence of forest fires between 2010 and 2020**

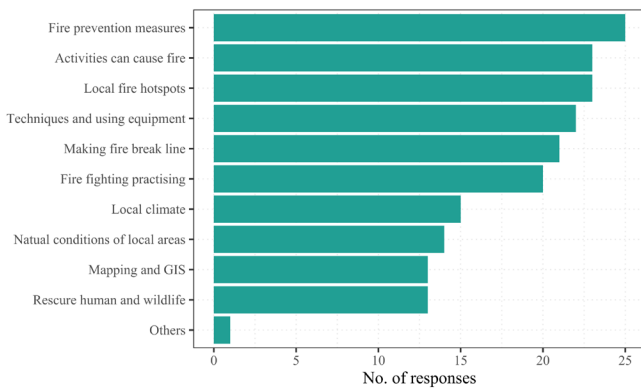
indicated as a most important cause more often than illegal logging, prescribed burning and other causes were. Prescribed burning is most common in deciduous dipterocarp forests.

In addition to the use of watchtowers, walkie-talkies and basic firefighting tools, three-quarters of respondents reported that their organization uses the Forest Protection Department’s online forest fire-monitoring system and SMS message notifications for the early detection of fires. Remote sensing and GIS, however, were used by only 7



**Figure 5: Causes of forest fires according to survey respondents**

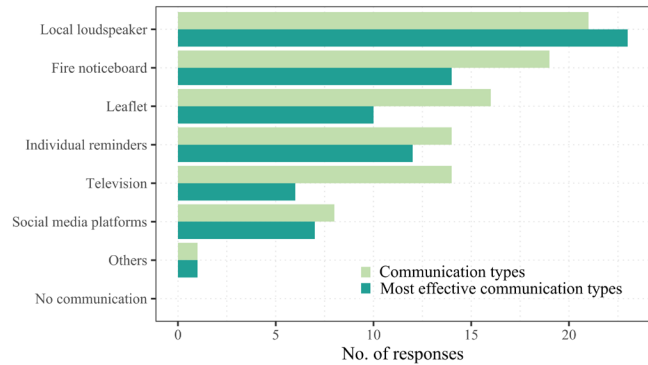
of the 28 organizations (25%), and other technologies were rarely used. One-quarter of the organizations use no advanced technology in forest fire prevention and firefighting. Almost two-thirds of the organizations (64%) had fewer than five staff members with skills in mapping, GIS, remote sensing and other technologies related to forest fire prevention and firefighting. However, in response to this situation, one-quarter of organizations were running two to five training courses per year on forest fire prevention and firefighting, and more than half ran at least one course per year. Training is carried out to improve the capacities of technical staff, local people and local authorities in measures that prevent forest fires, activities that can cause forest fires, determining potential locations of fires, the use of equipment, building firebreaks and firefighting demonstrations (Figure 6).



**Figure 6: Training topics, forest fire prevention and firefighting**

Given the limited resources for and capacity in forest fire prevention and firefighting, the dissemination of information in local areas is critical. Survey respondents indicated that the most effective means of providing information were local meetings, loudspeakers in the

communities, noticeboards that rate forest fire danger, leaflets, individual reminders, social media, and television (Figure 7).



**Figure 7: Communication on forest fire prevention and firefighting**

## Conclusions

Over the past 15 years, forest fires in Viet Nam have been decreasing, with fires now occurring more often in plantations than in natural forests. The most important drivers of this decreasing trend have been the enactment and effective implementation of policies that support forest and land allocation and economic development, together with strict regulations on forest protection. In terms of policy, Viet Nam appears to be a model that other countries could follow.

Given the fire-related issues associated with plantations, the increase of plantation areas, especially in the context of climate change, can be a challenge for forest management. With only modest numbers of staff members working on fire preventing and firefighting, and with limited equipment and resources, it is very important to raise awareness, improve technical capacities and disseminate information on forest fire prevention and firefighting for both local officials and forest owners. The results of the survey reported in this article indicate gaps that still need to be filled.

Sustainable forest management and forest certification, payment for forest environmental services, and carbon credits can also be valuable tools that help to reduce forest fires in Viet Nam. These measures need to be considered, especially in the context of the increased areas of forest plantations.

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