

fire suppression and control into this session is advisable. After Action Reviews (AARs) are necessary. Additionally, prescribed burning with various ignition patterns should be explored as it is becoming a common global practice.

7. Training Duration and Content

The four-and-a-half-day training with two half-day field sessions is insufficient given the breadth of information covered. A possible solution is dividing the course into two training periods, Level 1 and Level 2, across the year. Furthermore, a separate geo-informatics (GIS/RS/GPS/ICT) course for forest fire and smoke haze management should be considered, as geo-informatics is now integral to global forest fire management operations. Forest firefighters require access to current information of various types. Remote sensing data has become an indispensable and commonplace source of information for them.

In addition, there is merit in considering the establishment of a separate training program that focuses on community-based fire and water management. Building resilient communities is essential in tackling the issues at hand. Understanding forest fire investigation not only enriches the participants' knowledge but also bolsters their comprehension of fire behaviors, which is necessary for conducting accurate forest fire investigations.

THE WAY FORWARD.

Forest fire suppression plays a critical role in the overall control and management of forest fires, for which the presence of a forest fire monitoring and informatics system alone is insufficient without forest firefighters in place. Absent an active firefighting force, the whole structure of forest fire control and management is rendered ineffective, leaving such an information system hollow. It's essential to realize that forest firefighters, indeed, form the backbone of any successful forest fire control and management operation.

It is imperative to employ fire as a tool in combating wildfires. Disasters and severe events have transcended the realm of possibilities and have become inevitable certainties. The objectives of the training must be the

BOX 2. Summary of the Training

The training program titled "Training of Trainers for Forest Fire Suppression" took place from May 15 to 19, 2023, at the Sakaerat Environmental Research Station in Nakornratchasima Province, Thailand. It brought together 24 participants representing 12 AFoCO Member Countries: Bhutan, Cambodia, Indonesia, Kazakhstan, Kyrgyzstan, Mongolia, Myanmar, Philippines, Thailand, Timor-Leste, Republic of Korea, and Viet Nam.

The training included 16 enriching sessions delivered by four expert trainers, three of whom are associated with the French Civil Protection and one from the Upper ASEAN Wildland Fire Special Research Unit at Kasetsart University, Thailand. The training program was co-organized with the Royal Forest Department of Thailand and supported by the French Ministry of Europe and Foreign Affairs.

The primary objectives of the course were to:

- Equip participants with enhanced knowledge and skills in forest fire suppression through the integration of pertinent theories and practical/hands-on exercises.
- Empower participants to formulate and execute domestic training programs on forest fire suppression in their respective countries.
- Facilitate the exchange of knowledge and best practices in forest fire suppression among the AFoCO member countries.

cultivation of resilience and sustainability in order to fortify ourselves against the uncertainties of future climatic conditions and their severe manifestations. It is acknowledged that circumstances may differ in each country, however, the principle that guides us is mutual support and collective responsibility.

Acknowledgment

AFoCO appreciate support and cooperation by the Royal Forest Department of Thailand, the French Ministry of Europe and Foreign Affairs, and Dr. Veerachai Tanpipat* for his sharing expertise knowledge for assessment of this training course as the main forest fire trainer cooperating with RETC.

Strengthening Forest Firefighting Capabilities in AFoCO Member Countries through a Specialized 'Training of Trainers' Program for Forest Fire Suppression

BACKGROUND

Combatting forest fires requires teams that are not only well-equipped but also thoroughly trained. The crews involved must possess a multitude of skills, such as comprehending the nature of fire fuels, monitoring and assessing fire threats, applying suitable and specific firefighting strategies, determining an efficient firefighting strategy, and directing operations effectively.

During the virtual training of the AFoCO Regional Education and Training Center (RETC) on forest fire management in 2021, 47 young forest fire officers of 14 member countries pointed out that developing effective and well-structured communication schema across the level is a critical cross-cutting issue to ensure their support for effective fire prevention and management at all administrative levels. They shared a common view that enhancing the field-level forest firefighting capacities should be a prerequisite for the sound operation of the nationwide forest fire monitoring system.

In light of this context, AFoCO RETC, the Royal Forest Department of Thailand, and the French Ministry of Europe and Foreign Affairs collaborated to develop and execute a joint capacity-building initiative entitled "Training of Trainers on Forest Fire Suppression," which took place from 15th to 19th May 2023 in Thailand.

As the prototype of the RETC's long-term plan for fostering forest fire rangers in the member countries, the outcomes of the training course contributed to the foundational information for future governance enhancement in forest fire management across the participating countries. The field-level observations and insights were further integrally directed to the design of a three-day policy-driven high-level workshop organized in the Republic of Korea in October 2023.

Box 1. Key Messages

- To excel as a forest firefighter, it is imperative to have a comprehensive understanding of the behaviors exhibited by forest fires.
- The linchpin in controlling and suppressing forest fires lies in the hands of the "firefighters" present on-site.
- Prioritizing the safety of firefighters is paramount and should be the foremost consideration.
- When it comes to forest fire suppression, the hierarchy of priorities is structured as follows: firefighters take precedence, followed by property, and finally, the environment.
- Firefighters constitute the most critical component in any fire suppression and control operation.
- Heavy machinery, such as helicopters, should be viewed as instrumental assets that aid in the process.



Fire suppression simulations at Training of Trainers on Forest Fire Suppression on 15-19 May 2023 ©AFoCO



Asian Forest Cooperation Organization (AFoCO)

AFoCO is a treaty-based intergovernmental organization that is committed to strengthening forest cooperation and taking concrete actions to promote sustainable forest management and address the impacts of climate change.

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Policy Highlights on Training of Trainers (ToT) for Forest Fire Suppression

The efficacy of forest fire suppression operations is contingent upon the availability of proficient forest firefighting personnel. A critical foundational element entails the amplification of existing proficiencies and the constitution or enhancement of forest firefighter contingents where they are non-existent or inadequate as delineated in Figure 1.

1. Shortage of Forest Firefighters

There is a noticeable shortage of forest firefighters and suppression agents among several countries, specifically Cambodia, Lao PDR, Myanmar, Philippines, Timor-Leste, and Viet Nam. AFoCO plays a vital role in assisting these nations in developing the capacities of these essential entities. Additionally, for countries that already have existing human resources, AFoCO can provide support to enhance their effectiveness. A bespoke course aimed at training nascent forest firefighters in quintessential firefighting skills could be adapted to meet the discrete needs of each nation devoid of forest firefighters or fire suppression teams. Sustained training is vital for the amelioration of forest fire suppression methodologies and for ensuring that firefighters are equipped with up-to-date expertise.

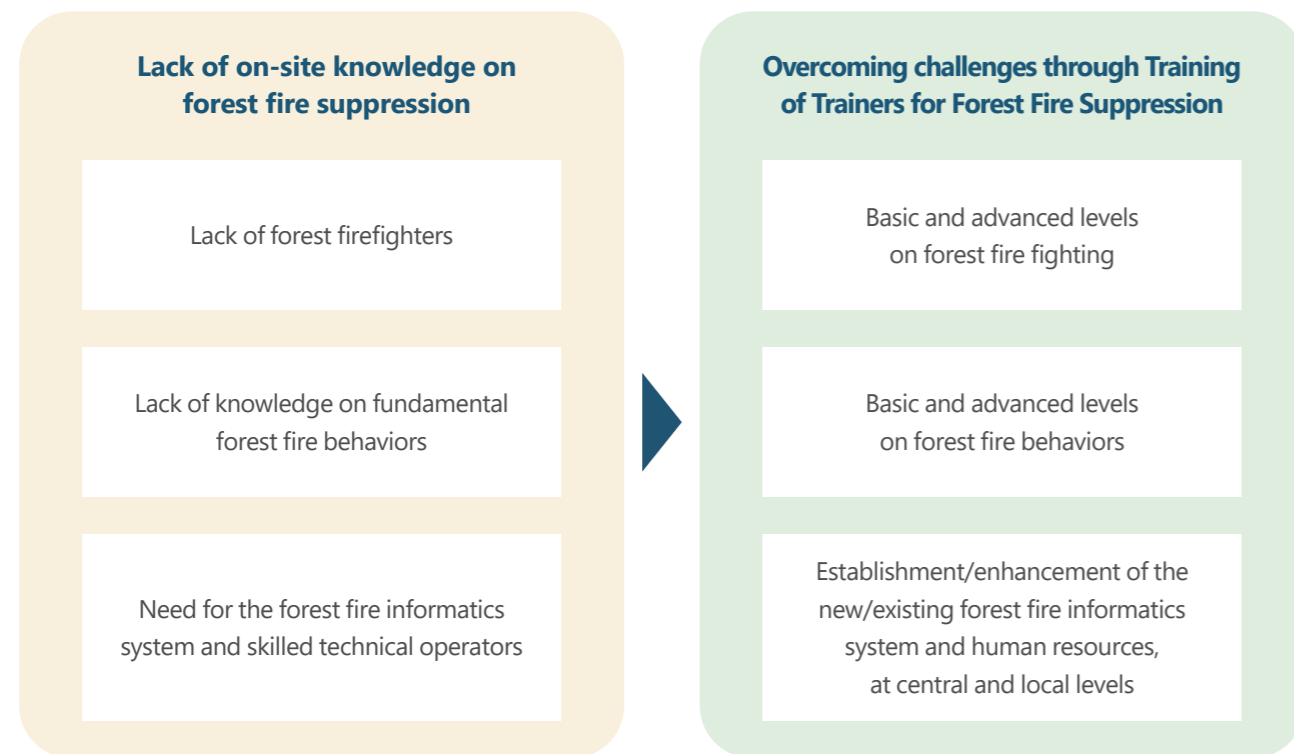


Figure 1. Overcoming challenges related to the lack of capacities through Training of Trainers on Forest Fire Suppression

2. Deficit in Comprehension of Forest Fire Dynamics

A lack of understanding concerning forest fire dynamics is widespread among member countries. The design and implementation of a meticulously structured course to disseminate this elemental knowledge are imperative in cultivating adept firefighters. Climatic shifts necessitate a more profound comprehension of the fire behavior triangle- topography, weather, and fuel. A mastery of these components guarantees a safer and more effective approach to fire suppression. Owing to the vast spectrum of information, the course could be stratified into foundational and advanced modules.

3. Necessity for a Forest Fire Informatics Framework

There is a need for a comprehensive forest fire informatics framework that can be utilized for monitoring and managing forest fires in member countries. Establishing either a centralized or localized framework would greatly enhance forest fire management efforts. Combining skilled ground-level firefighters with regular aerial monitoring is essential for effectively containing wildfires and ensuring their successful suppression.

Potentials and Challenges in ToT for Forest Fire Suppression

Through the training course, the RETC was trying to explore its future direction and which parts need to be specifically addressed by the training. Below is the overall assessment conducted by the RETC's main forest fire trainer*. The expected learning outcomes set by the course were as follows:

- Outcome 1: Augmentation of forest fire suppression knowledge and skills through the assimilation of pertinent theories and practical/hands-on exercises.
- Outcome 2: Formulation of strategies to facilitate domestic training on forest fire suppression within their respective countries.

1. Outcome Assessment

All participants were able to achieve Outcome 1 to some extent. However, in terms of understanding forest fire behaviors, there is a need for additional time for participants to assimilate and reflect on the information shared by trainers and to engage in discussions. While some participants who are already forest firefighters possess experience, enhancement of their skills requires an advanced learning process. Outcome 2 was not fully achieved by the participants within the four-and-a-half-day training period but gave the RETC diverse wisdom to identify the approaches toward the member countries. It is recommended that an additional week of training be appended to allow participants to develop their domestic training strategies.

2. Language Proficiency Not a Barrier to Participation

The decision to waive English proficiency requirements for participants yielded better results than anticipated. Participants from countries not being proficient in English engaged actively in the sessions. This experience demonstrates that English proficiency sometimes is not a main requirement for participation in the training course. However, if an applicable standardized textbook is developed, it may be necessary to consider translating the manual into the local language.

3. Necessity of Online Learning Courses

It is imperative to ensure inclusive participation in future training. For this, it is recommended to develop an online learning program. AFoCO has created three essential online modules related to forest fire management in 2021 as below, and based on this, it is necessary to further diversify modules according to levels and targets:

- Module 1: Fundamentals of Forest Fire Management <https://bit.ly/3r7Aqzy>
- Module 2: Forest Fire Management Approaches <https://bit.ly/3NvIRvI>
- Module 3: Technology for Forest Fire Management <https://bit.ly/43271nB>

4. Map Reading and Practical Field Exercises

The training provided diverse countries with skills in using topographic maps for fire analysis and predicting fire behaviors. Participants could learn the fundamentals of maps, different types of projections, and basic map reading. In future training, instructions on (1) integrating compass navigation with topographic maps, (2) traversing to designated locations, and (3) conducting surveys with a GPS can be additionally provided. Preparing ample topographic maps in advance will further enable participants to gain practical experience.

5. Interactive Fire Behavior Understanding

Employing a sandbox and a fire cross to grasp fire behavior is an effective, hands-on approach that visually demonstrates fire behavior in mountainous terrain. A sandbox can be employed to simulate various scenarios, while the fire cross can be used with various fuels to model a realistic burn. This setup also allows observation of smoke behavior in mountainous and valley areas, and the creation of a fire tornado simulation. Additionally, participants can experience the intensity of radiant heat and learn techniques to avoid smoke inhalation.

6. Enhancing Fire Suppression Techniques

Participants should practice various fire suppression techniques including dry suppression, a combination of dry and wet suppression, and wet suppression. This necessitates well-prepared fire suppression equipment and tools. A session for exchanging suppression techniques from different countries is recommended to foster collective improvement. Time permitting, integration of