

6. Enhancing Fire Suppression Techniques

Participants practiced dry and wet fire suppression techniques, but additional sessions on exchanging suppression techniques across countries would enhance collective knowledge. Time permitting, integrating After Action Reviews (AARs) into the curriculum would further improve the learning process.

7. Prescribed Burning Techniques and Practices

Acquiring legal burn permits is critical for conducting prescribed burns. Future courses should include this as a standard practice to arrange the training program. Unless there is no permit, for example, the participants have to wait until all satellites are passed to avoid hotspot detection, in the main forest fire control monitoring system in the central command center in Bangkok. Additionally, various ignition patterns should also be explored to align with global practices.

8. Country Reports

A seminar-style session where trainees present their country's forest fire status should be incorporated to foster knowledge exchange, which will be expected to fulfill Outcome 2. Such discussions at the beginning and end of the course would enable participants to share how they intend to implement learned practices in their home countries.

WAY FORWARD

A deep understanding of forest and wildland fire behavior is fundamental to effective and safe fire suppression. It forms the foundation of fire control and management efforts in AFoCO member countries. The techniques and knowledge imparted by trainers can significantly enhance the capabilities of forest and wildland firefighters. Additionally, the implementation of a cloud-based fire and smoke monitoring and informatics system is critical for improving the efficiency, effectiveness, and safety of fire suppression operations.

Well-trained firefighters are essential to successful fire management, and the guidelines on 'Ten Standard Firefighting Orders and Eighteen Watchout Situations' remain crucial. Above all, competent and confident leadership is the key to success in wildland firefighting. Leadership provides purpose, direction, and motivation, enabling firefighters to navigate the complexities of dangerous and stressful environments.

Box 2. Summary of the Training

The training program titled "The Second Training of Trainers for Forest Fire Suppression" was organized from 15 to 28 March 2024, Thong Pha Pom, Kanchanaburi Province, Thailand. There were 19 trainees participating from 10 AFoCO Member Countries: Bhutan, Cambodia, Indonesia, Kazakhstan, Kyrgyzstan, Mongolia, Myanmar, Thailand, Timor-Leste, and Viet Nam.

The training included 16 enriching sessions delivered by six (6) expert trainers: three from the French Civil Protection, one from the Upper ASEAN Wildland Fire Special Research Unit at Kasetsart University, Thailand, one from the Jincheon Forest Aviation Station, Forest Aviation Headquarters, Korea Forest Service, and one from the Fire Risk, Research and Community Preparedness in Victoria, Australia. The training program was co-organized by 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 trainees with basic and enhanced knowledge and skills in forest and wildland fire suppression through the integration of pertinent theories and practical/hands-on exercises.
- Empower trainees to formulate and execute domestic training programs on forest fire suppression in their respective countries.
- Facilitate the exchange of knowledge and best practices in fire suppression among the AFoCO member countries.

Acknowledgment

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The 2nd Collaborative Endeavors to Strengthening Forest Firefighting Capabilities in AFoCO Member Countries : A Specialized 'Training of Trainers' Program for Forest Fire Suppression

BACKGROUND

Forest fires control and management require well-trained and knowledgeable team with the right equipment, mental health, and strong leadership. For the forest and wildland firefighting, there are many skills and knowledge needed. A fundamental requirement is a true understanding of fire behaviors. It is the foundation of fire control and management. Forest and wildland firefighters need to possess the right level of physical strength, knowledge, skills, techniques, mental, and teamwork mindset. They need to apply suitable, specific, effective, and efficient firefighting strategies.

Following the success of the first Training of Trainers (ToT) for Forest Fire Suppression from 15 to 19 May 2023 in Thailand¹, the second ToT is designed reflecting its lessons learned. The period is twice longer and the module included more burning simulations to provide participants with hands-on experience in fire suppression. It is specifically designed to enhance capabilities in Fire Behavior Analysis (FBA) and Prescribed Fires.

The AFoCO Regional Education and Training Center (RETC), in cooperation with the French Ministry of Europe and Foreign Affairs and the Royal Forest Department (RFD) of Thailand, is currently developing a Regional Capacity Building Program on Forest Fire Management for Climate Action. As an important part of the RETC's long-term capacity building program to support forest and wildland fire control and management in member countries, the outcomes of this second ToT course will contribute as another steppingstone and concrete foundation for future corporate governance enhancement in forest/wildland fire control and management across the member countries.

Box 1. Key Messages

- Understanding fire behavior saves lives, as it is essential for effective firefighting and ensuring the safety of personnel.
- Effective fire management requires that firefighters take command of the fire, not simply react to it.
- Utilizing prescribed burns is a critical tool in managing fire fuels and reducing the risk of uncontrolled wildfires.
- Firefighters are the most important element in all fire suppression, control, and management operations.
- Successful forest and wildland firefighting relies on competent and confident leadership, providing clear direction and motivation.



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.

www.afocosec.org

¹ AFoCO (2023) Strengthening Forest Firefighting Capabilities in AFoCO Member Countries through a Specialized 'Training of Trainers' Program for Forest Fire Suppression. <https://shorturl.at/Vo2Vb>

Policy Highlights on Training of Trainers for Forest Fire Suppression

The three key policy recommendations outlined below were drawn from the first ToT in 2023, with more detailed recommendations developed during the second ToT in 2024.

1. Deficiency of Dedicated Forest/Wildland Firefighting Units

Many AFoCO Member Countries, including Brunei Darussalam, Cambodia, Lao PDR, Myanmar, the Philippines, Timor-Leste, and Viet Nam, still do not have dedicated forest and wildland fire control unit or division in their respective government agencies, who can foster firefighters. Instead, they rely on structural firefighters, who often cannot effectively respond to fires in remote or difficult-to-access areas. It is very crucial for AFoCO to facilitate the establishment of these indispensable entities within those nations, as this is the foundation for addressing forest and wildland fire challenges.

For member countries that have already developed such units (refer to Thailand's case in Figure 1), AFoCO's support can enhance their operational capacity by improving the efficiency, safety, and effectiveness of their fire suppression strategies. This can be achieved through upgrading firefighting equipment and integrating advanced suppression techniques from countries like the Republic of Korea (ROK), France, and Australia.

Furthermore, continuous capacity-building programs, ranging from basic to advanced and expert-level training, are essential. A specific focus on leadership development is also critical to cultivate competent fire commanders capable of overseeing complex fire suppression operations.

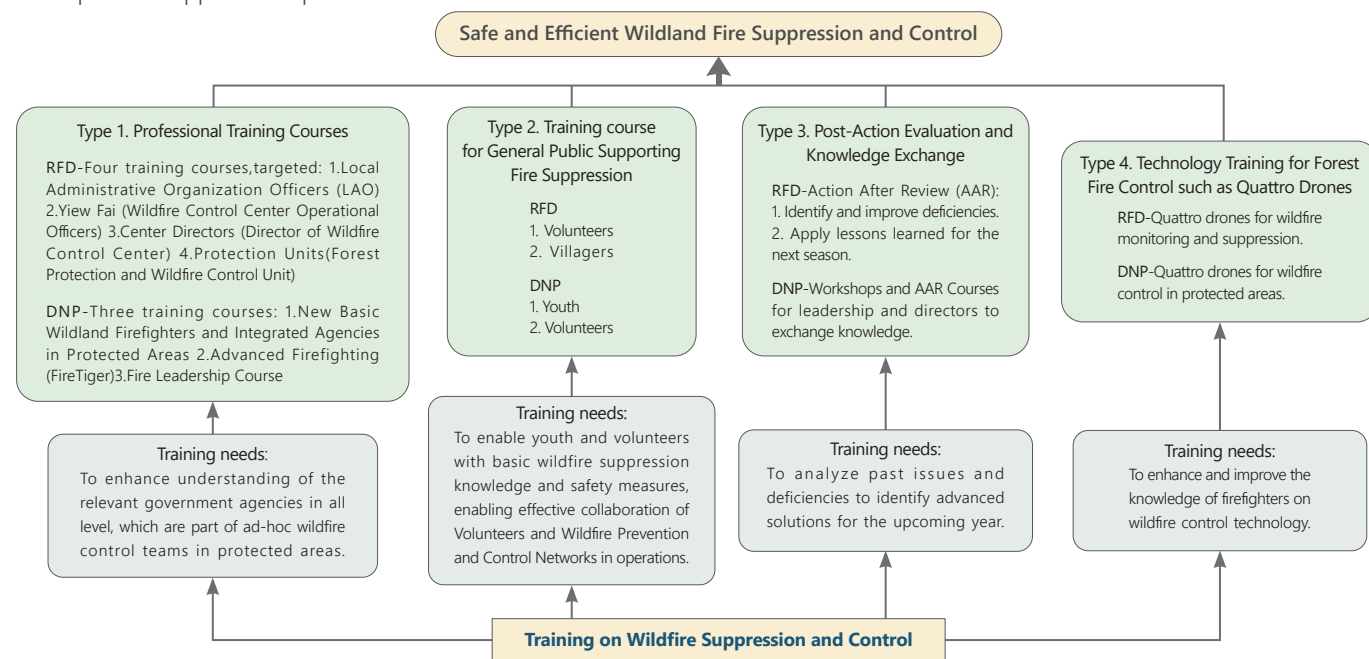


Figure 1. Training Structure of Royal Forest Department (RFD) and Department of National Parks, Wildlife and Plant Conservation (DNP) of Thailand for Forest Fire Suppression

2. Deficit in Comprehensive Wildfire Science and Dynamics

Understanding the fundamental principles of fire behavior—shaped by the interaction of topography, weather, and fuel—is consistent across global contexts. However, regional variations require tailored application of this knowledge to address specific environmental conditions. As the impacts of climate change introduce greater uncertainty, mastering the science of fire behavior is paramount for enhancing the proficiency, efficiency, and safety of fire suppression efforts. Comprehensive training must be stratified into foundational, advanced, and leadership-focused modules, ensuring a structured learning path that culminates in operational expertise.

3. Necessity for a Forest/Wildland Fire Informatics Framework

Over the past three decades, global collaborations have yielded advanced tools for monitoring, forecasting, and mitigating the effects of forest and wildland fires, along with smoke-related impacts. Despite this, the absence of a unified, cloud-based informatics system in AFoCO member countries hinders progress². There is an urgent need to implement an open-access system for data sharing and real-time monitoring. Such a system would form the cornerstone of a robust situation management system (SMS) and decision support system (DSS), providing critical insights for more responsive and coordinated fire suppression efforts. Establishing this platform across all member countries is essential for enhancing regional fire management capabilities.

Potentials and Challenges in ToT for Forest Fire Suppression

The RETC utilized this training course to define its future direction, focusing on areas critical for advancing forest/wildland fire suppression. Below is the assessment of the outcomes, conducted by the RETC's main forest fire management trainer*:

- Outcome 1: Improve participants' skills in fire behavior analysis and prescribed burning through theoretical instruction and hands-on exercises.
- Outcome 2: Equip participants to develop domestic training programs for forest fire suppression in their home countries.

1. Outcome Assessment

Participants generally achieved Outcome 1, gaining improved understanding of fire behavior analysis and prescribed burning techniques. However, additional practice with prescribed burning will be necessary when participants return to their respective countries. Outcome 2 was partially achieved, with few participants demonstrating the potential to become trainers. Developing a teaching mindset remains a challenge, but the course provided foundational knowledge in fire behavior and the essential skills for forest/wildland firefighting.

Training included practical exercises, such as sandbox simulations and fire-cross burns, to enhance participants' of fire dynamics. Participants conducted burns on different slopes and fuel loads, constructed firelines and firebreaks, and were introduced to various hand tools and Personal Protection Equipment (PPE) from France, the ROK, and Thailand.

- 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. Tactical and Topographic Map Reading and Practical Field Exercises

While trainees learned basic tactical and topographic map reading and fire behavior analysis, more time is needed for field practice. Future training should consider allocating time to conduct with instructions on: (1) integrating compass navigation with maps, (2) navigating to designated locations, and (3) conducting field surveys using a compass and GPS in conjunction with maps, and (4) generating survey maps at various scales.



2. Language Proficiency

Waiving English proficiency requirements allowed for active participation by non-English-speaking trainees, proving that language should not be a barrier in this course. Trainees effectively engaged despite language differences.

3. Necessity of Online Learning Courses

There remains a need for online resources to supplement in-person training. Existing materials such as from National Wildfire Coordinating Group³ and Wildland Fire Learning Portal⁴ can provide diverse-level courses. AFoCO's current modules on forest fire management also need to be expanded to include different skill levels, yet it is necessary to create more modules in different levels more than the basic one:

5. Interactive Fire Behavior Understanding

Employing a sandbox and a fire-cross to further understanding of fire behaviors is a very effective way of learning, hands-on approach that visually demonstrates fire dynamics in mountainous terrain under different scenarios. A sandbox can be employed to simulate various discussed scenarios, while a fire-cross can be used with various fuels types to simulate burns. The selected areas for burning, which are fall under the Forest Industry Organization's (FIO) mandate for both fire-cross and prescribed burns, were appropriate and well-suited. The fire-cross area is wide and safe enough to conduct burns. Due to the hot weather condition, shaded areas were provided for trainees to rest at the fire-cross area. This set up also allows observation of smoke behaviors in mountainous and valley areas. Additionally, trainees could experience the intensity of radiant heat from both the sun and the fires, while also learning techniques to avoid smoke inhalation from different wind directions.

² AFoCO (2022) Envisioning an Integrated Information System for Forest Fire Management: Current Status and the Way Forward. <https://shorturl.at/LOYLZ>

³ S-290 Intermediate Fire Behavior from University Corporation for Atmospheric Research (UCAR) MetEd (<https://www.meted.ucar.edu>)

⁴ Wildland Fire Learning Portal (<https://wildlandfirelearningportal.net>)