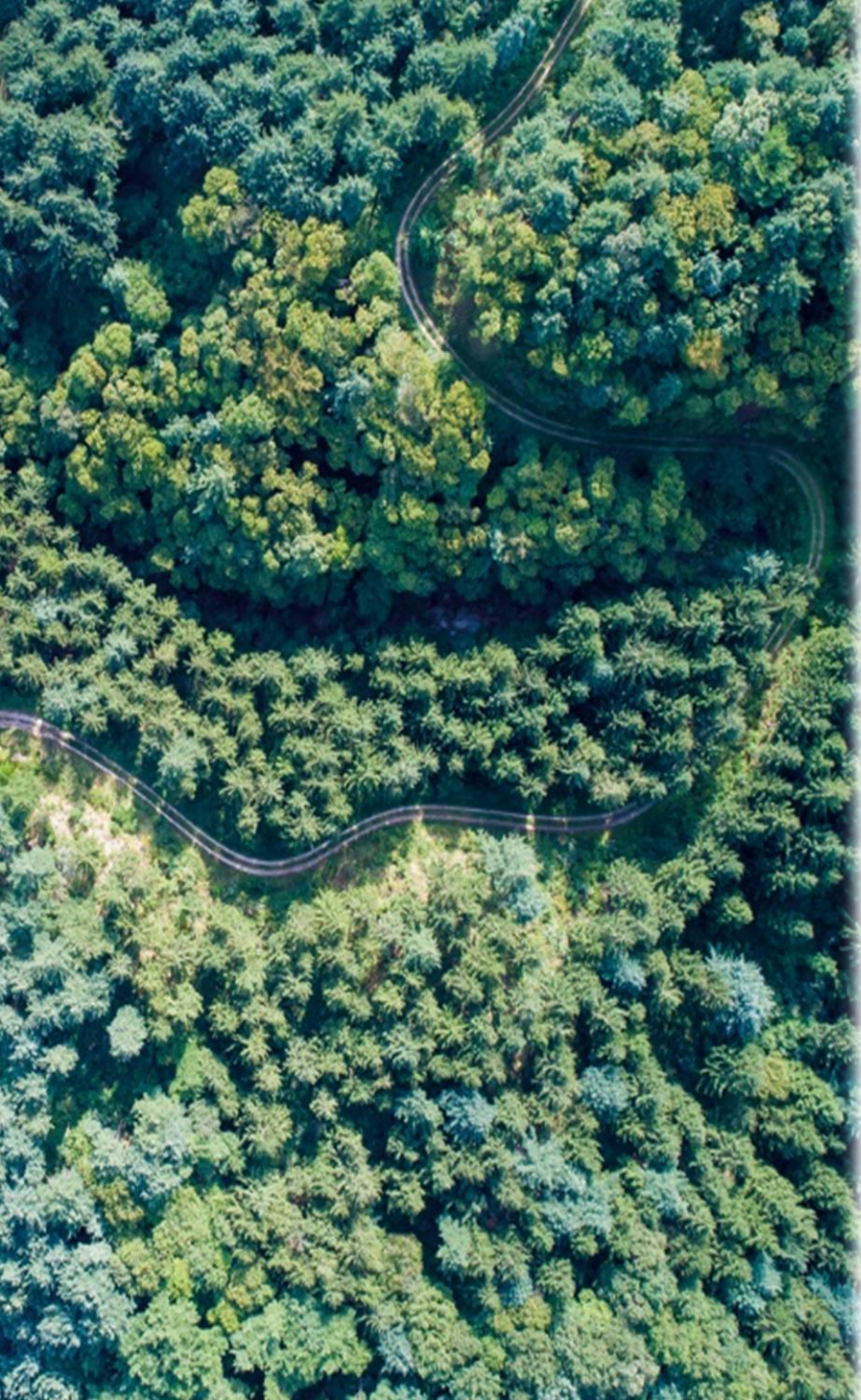# Forest Fire Control Policies in the Republic of Korea

Jina Kim, Director

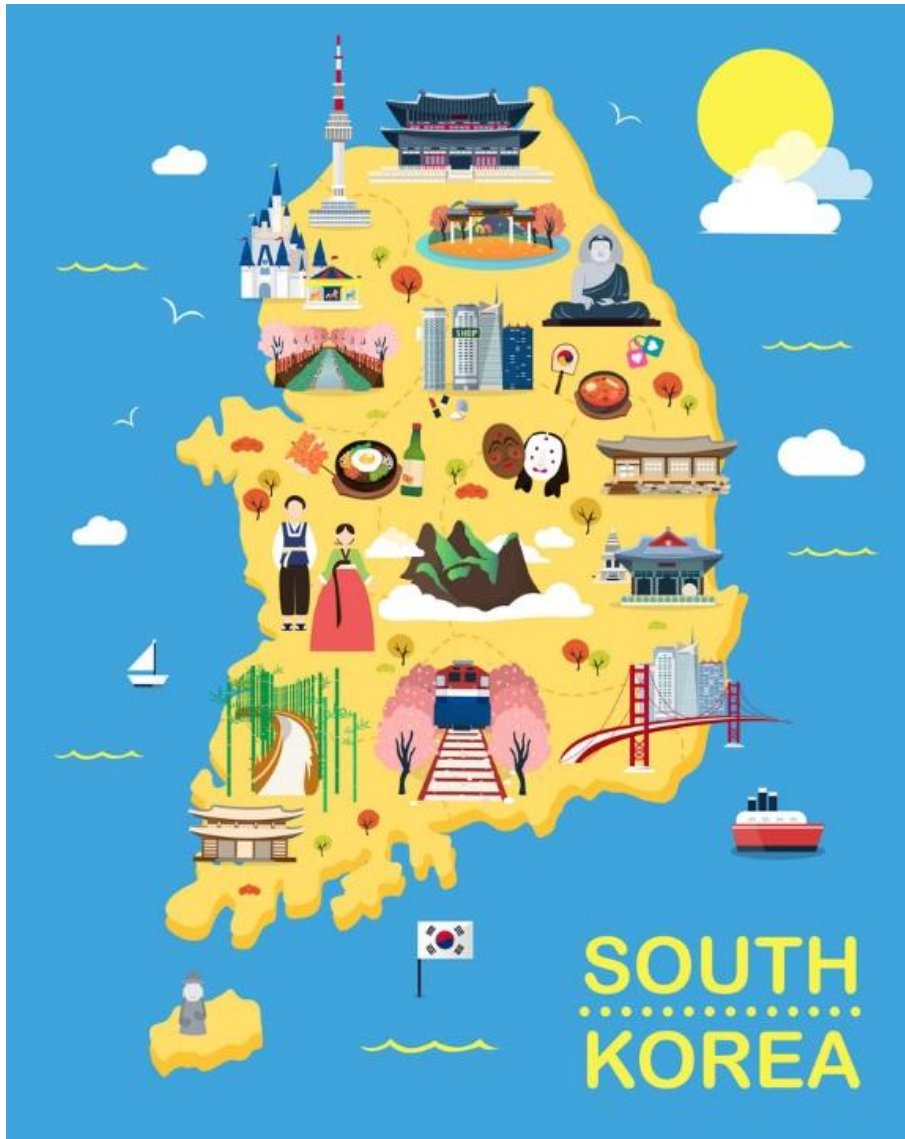**International Cooperation Division**

6 May 2024

산림청

Contents

Ⅰ. Overview of the Korea Forest Service

Ⅱ. Forest Fires in Korea

Ⅲ. Forest Fire Control System

Republic of Korea in a Glance

Area : 100,363㎢

Capital : Seoul
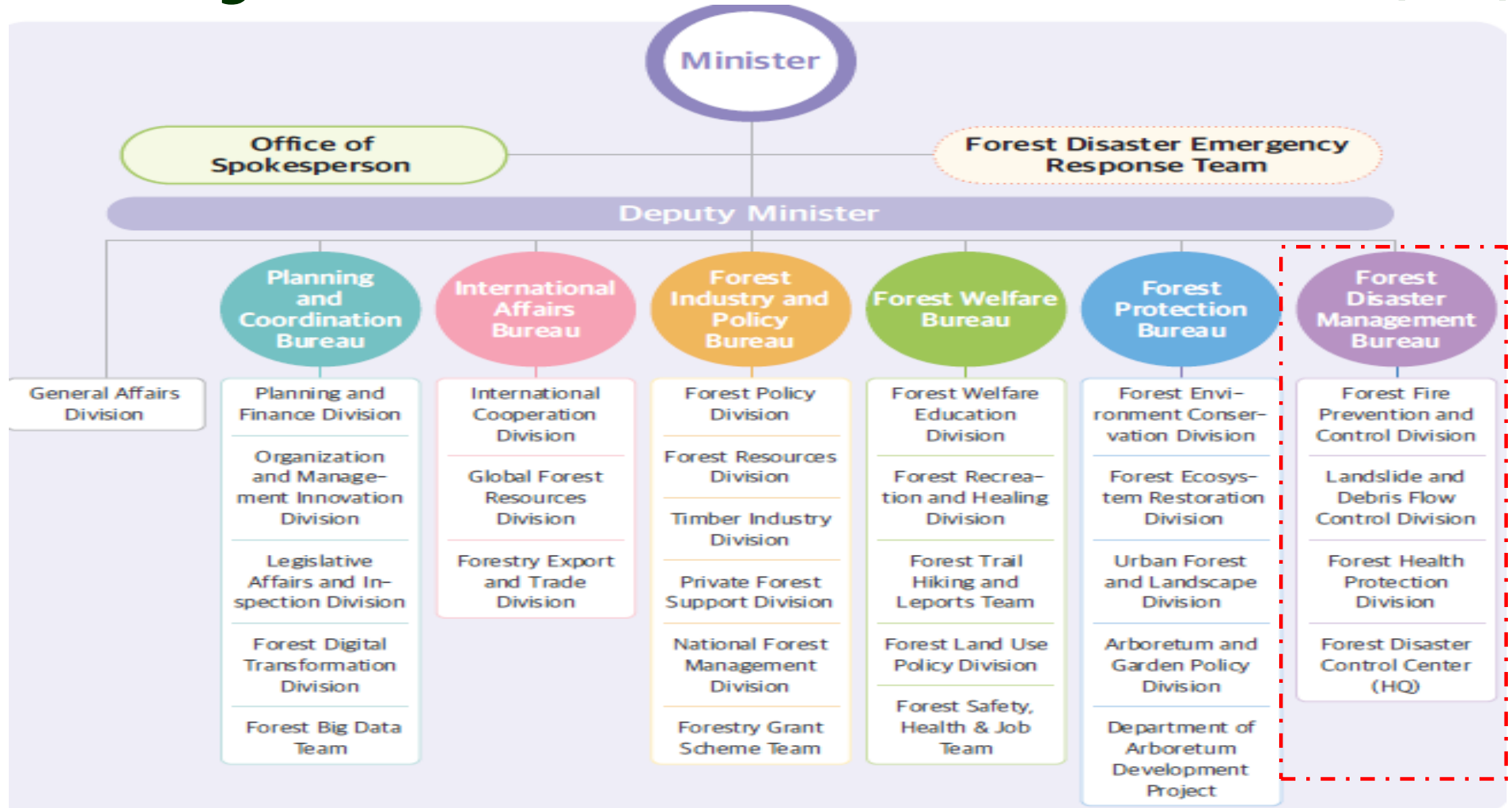
Per Capita Income : $34,983 (2021)

Area : 100,363㎢

Forests : 63,834㎢ (63%)

Population : 51.4 M
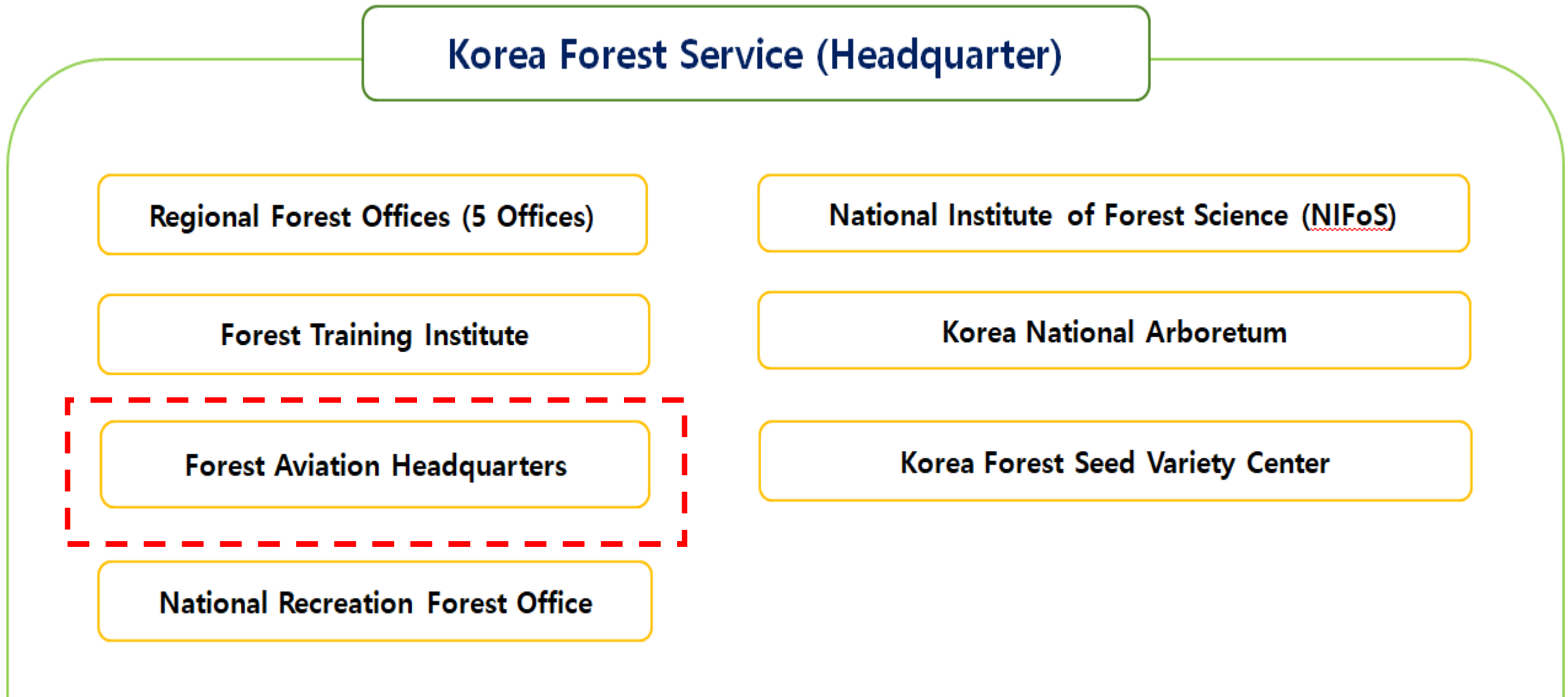
Growing Stock per Ha : 165㎥ (2020)

Highly intensive

forest fire control due to dense population

in relatively small land area (63% forested)

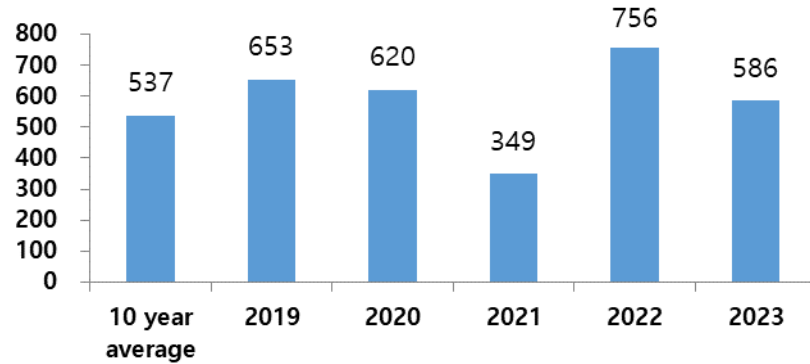# I -1. Organization Chart of the Korea Forest Service (KFS)

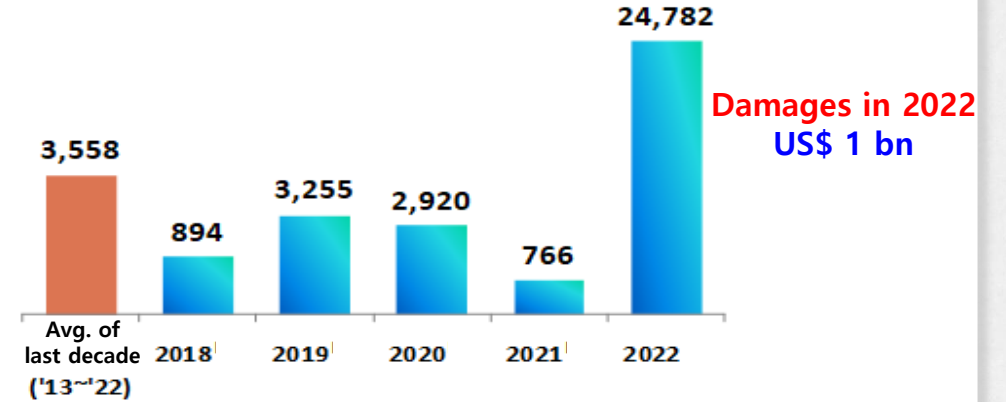# Agencies Affiliated with the KFS
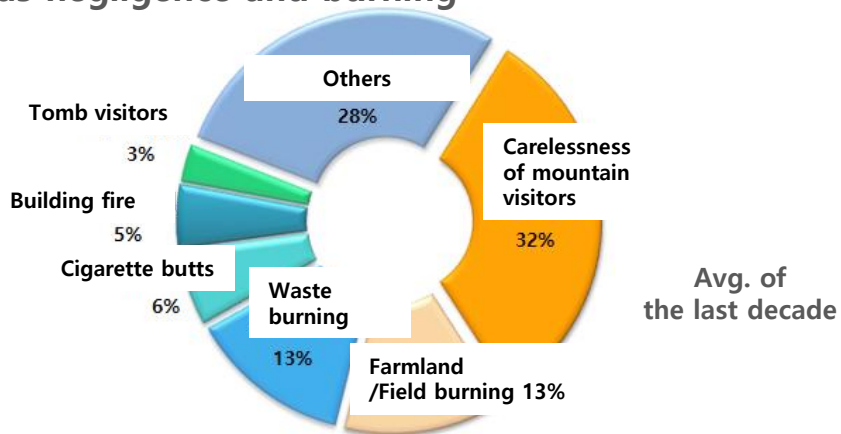

5

II. Forest Fires in Korea

- **2022 had 756 forest fires, 41% increase** compared to the average of the last decade

- **Burned areas (ha) increased by 7 fold** compared to the average of the last decade

Damages in 2022 US$ 1 bn

- **Main cause is human activity** such as negligence and burning

Others 28%

Tomb visitors 3%

Building fire 5%

Cigarette butts 6%

Waste burning 13%

Farmland /Field burning 13%

Carelessness of mountain visitors 32%

Avg. of the last decade

- Climate change makes forest fires break out **all year round**

● 1980s   ● 2020s
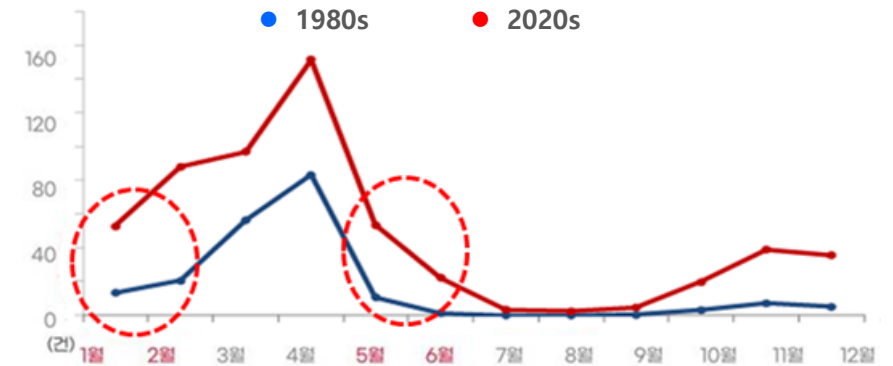
Forest Fires Increasing in Korea

Dry Weather

According to KFS' findings, 58% of annual forest fires are concentrated in spring (March and April).

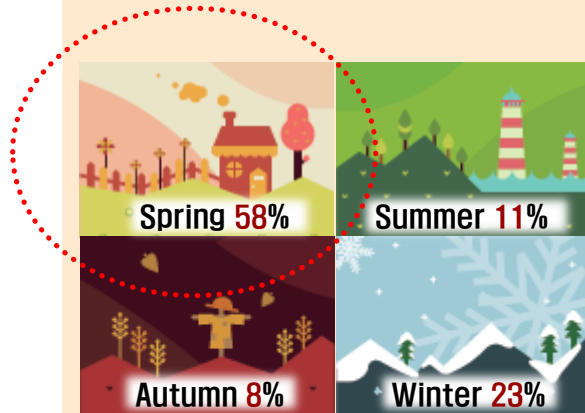Spring 58%   Summer 11%
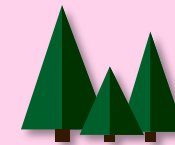
Autumn 8%   Winter 23%

Mountainous Terrain

Forest fires tend to spread more rapidly in mountainous regions with steep terrains than flat region.

The high east and low west topography also causes localized strong winds during the spring season in the east coast of Gangwon province.

Pure Pine Stand

Pine trees are known to be vulnerable to forest fires as they contain a lot of the volatile substance "terpene." Pine trees account for the largest part of all pure forests in Korea.
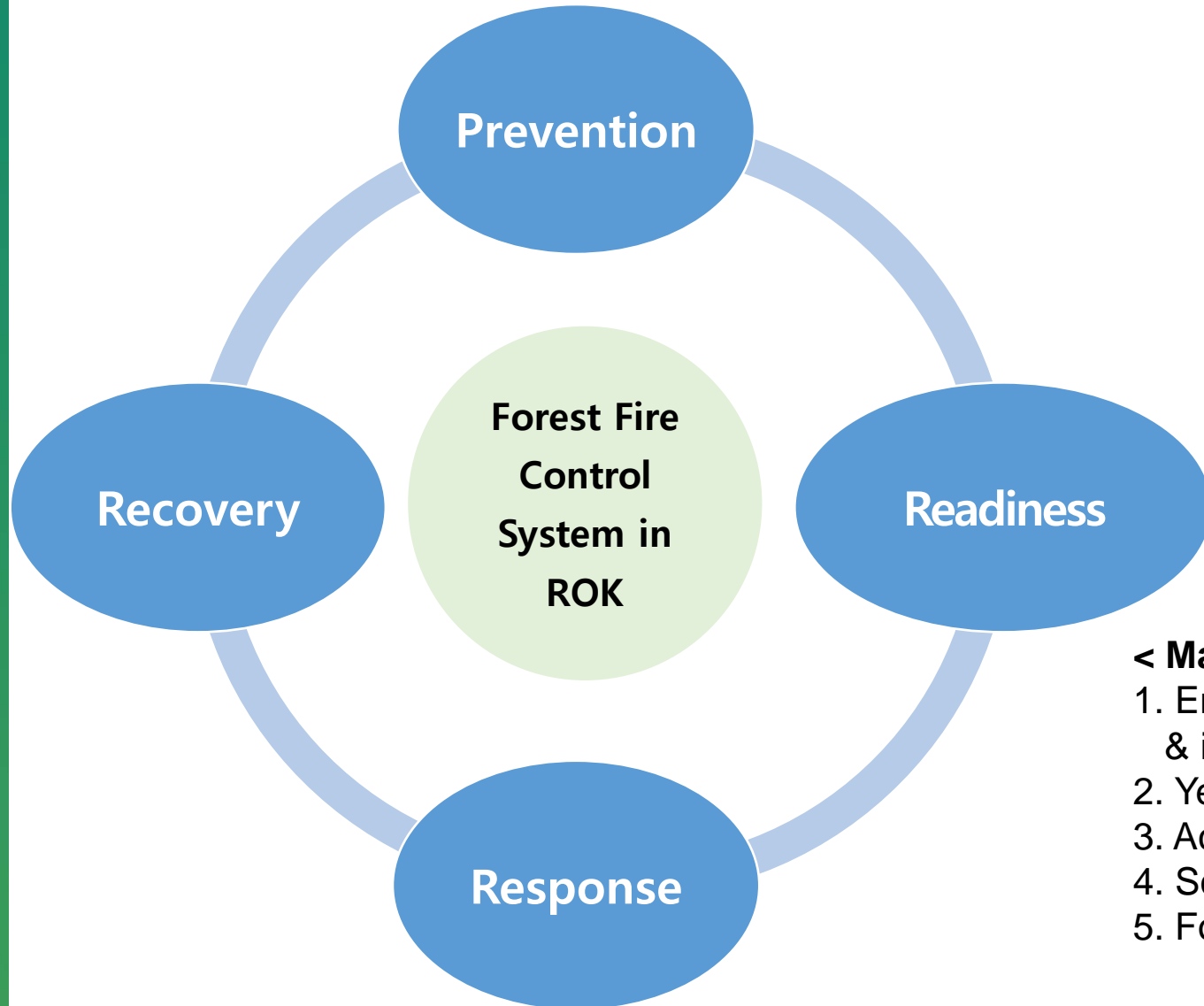
36.9%

<Coniferous forest> <Pine tree stand>

Ⅲ. Forest Fire Control System

Prevention

Recovery

Forest Fire Control System in ROK

Readiness

Response

2023년도 전국 산불방지 종합대책

Comprehensive Measures to Control Forest Fires *by KFS*

2023. 1. 6.

산　림　청

< Main Points >
1. Enhanced cause-specific forest fire prevention & infrastructure
2. Year-round forest fire response system
3. Accurate on-site analysis & swift response
4. Scientific technology-driven forest fire response
5. Forest fire cause survey & damage restoration

Ⅲ-1. Forest Fire Control System (Prevention)

> **Eradicate burning agricultural byproducts:** collecting and crushing agricultural byproducts in collaboration with several ministries.

> **Fire Resistant Forests:** Well-designed forest practices including thinning, pruning, and reducing vegetation to create openings which reduces buildup of fuel for fires.
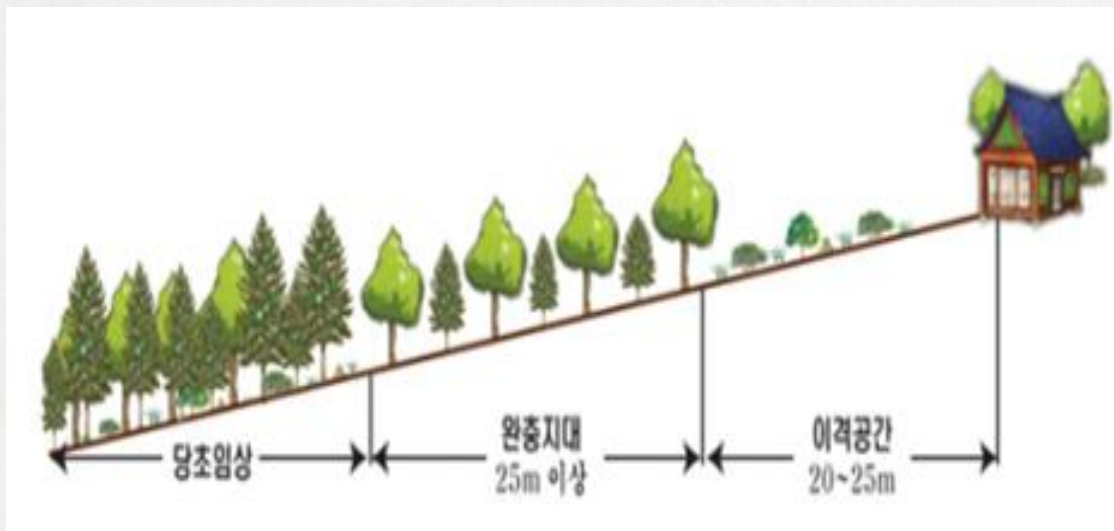
Ⅲ-1. Forest Fire Control System (Prevention)

➤ Fire Defensible Space

- Fire-resistant trees in pine forests and around towns create a firebreak zone.
- Defensible space around buildings can help protect them from forest fires.

➤ Forest Fire Extinguishing Facilities

- Installation of forest fire extinguishing facilities to protect cultural properties and temples in forests.


**Fire Defensible Space**

Forest Fire Extinguishing Facilities

Ⅲ-2. Forest Fire Control System (Readiness)

➤ Forest Fire Risk Forecast

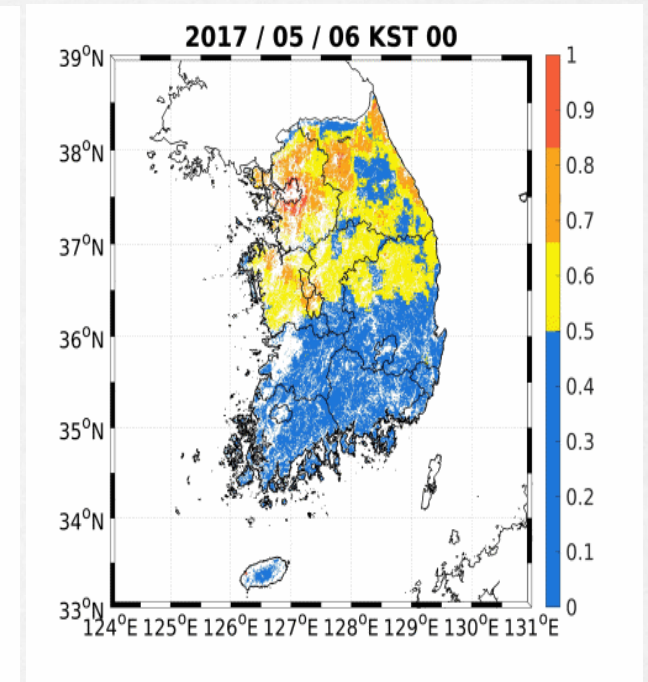- ▪ **The KFS has developed a data-driven Forest Fire Risk Prediction System to provide early warnings for the public and to facilitate immediate response.**
- ▪ **Anyone can access the system and get information on projected forest fire risk levels nationwide**

Forest Fire Risk Forecast (http://forestfire.nifos.go.kr)
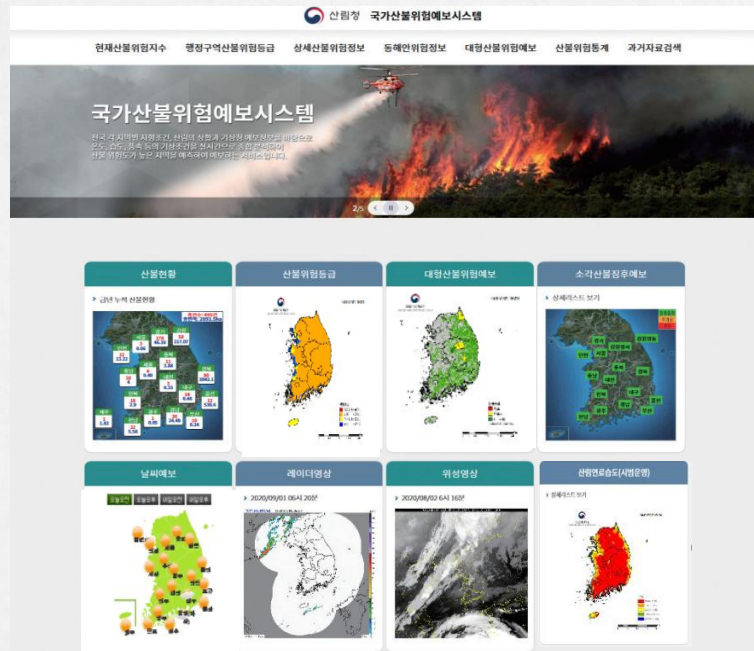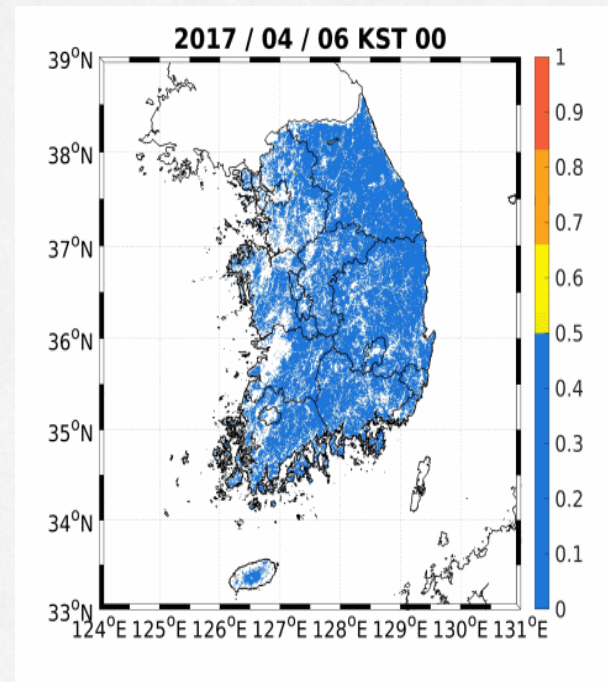
Safe day from forest fires

Day with high risk of forest fires

Ⅲ-2. **Forest Fire Control System (Readiness)**

➢ **Innovative System using ICT**

- ▪ **Automatic SMS alert and warning sent to local residents**
- ▪ **Early fire detection mobilizing 350 fire monitoring drones and 1,448 surveillance cameras**
- ▪ **Fire information collected through smartphone application (location, photos and videos of fires)**

Fire Alert	**Fire Detection**	**Fire Report**

Fire Alert

[Web발신]
<산림청 대형산불 주의보>
지역 : 강원 인제 인제읍 일대
풍속 : 7.5m/s
실효습도 : 35.8%

[Web발신]
<산림청 대형산불 주의보>
지역 : 강원 양양 강현면 일대
풍속 : 7m/s
실효습도 : 35.8%

- ❖ **Effective Humidity < 45%**
- ❖ **Wind speed > 7m/s**

Thermal Images of Flames and Embers

Ⅲ-3. Forest Fire Control System (Response)

➤ **Forest Disaster Control Center** operates 24 hours a day, 365 days a year

- **Forest Fire Monitoring System** provides real-time information on deployment of firefighting resources and status of fire suppression
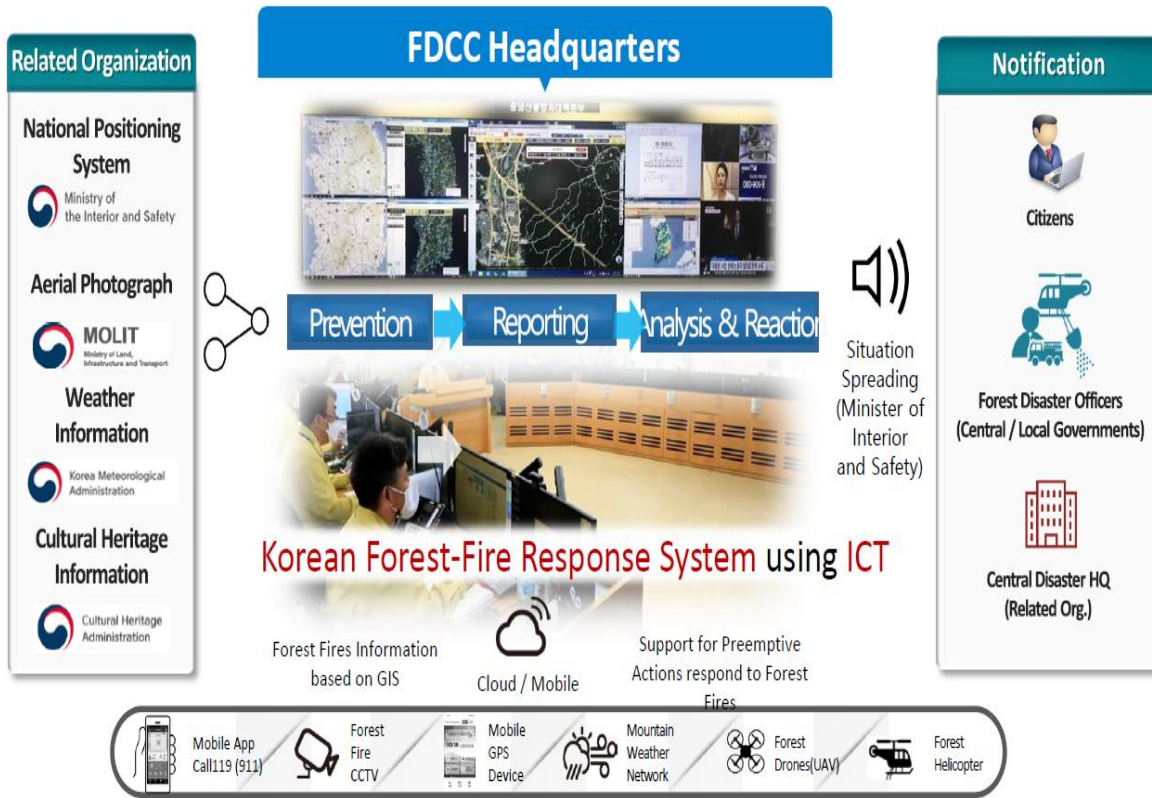
Forest Disaster Control Center (FDCC)

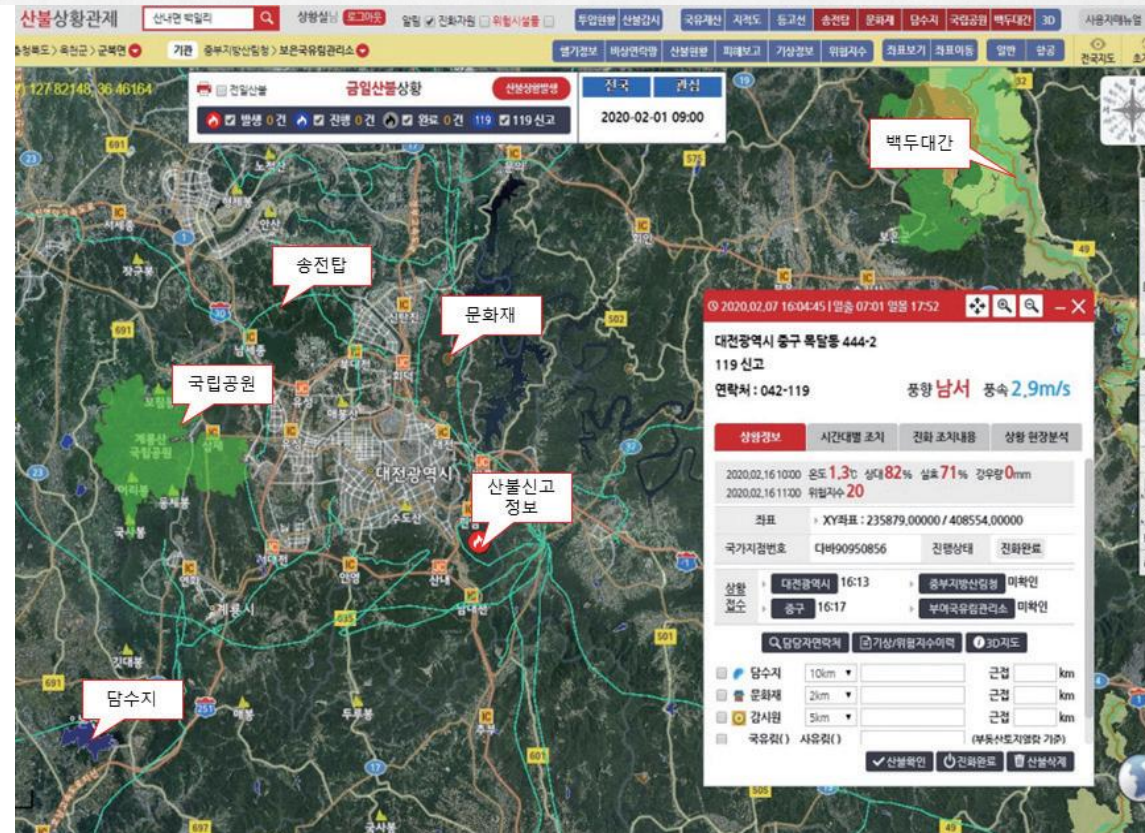Forest Fire Monitoring System

Ⅲ-3. Forest Fire Control System (Response)

➤ Fire Suppression (Firefighters)

- **Three types of forest firefighters cooperate according to the type of mission using different technique, equipment, and training**
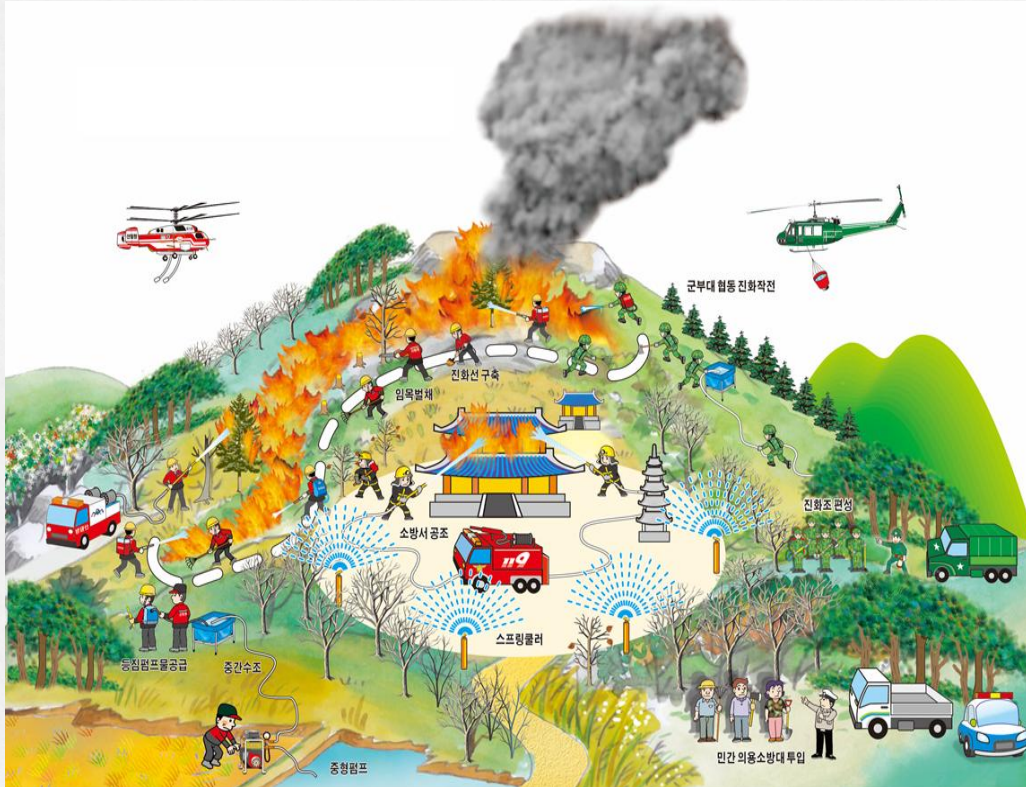
Constructing Fire-breaking Space

Rappelling from Helicopter

Forest Fire Spread Prediction System
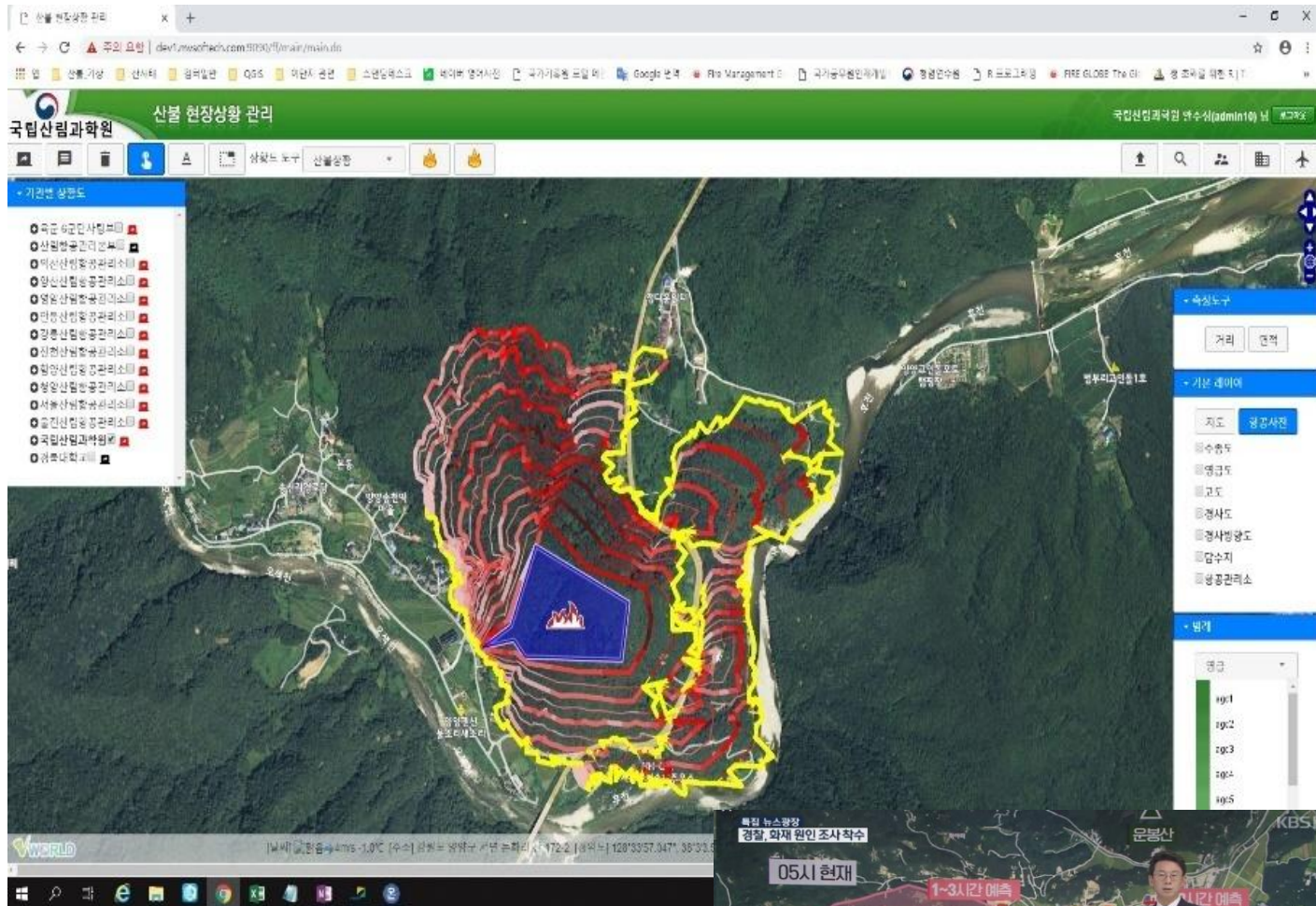
- The system was developed by the National Institute of Forest Science (NIFoS).

- The system analyzes meteorological information, forest types, and fire spreading forecasts.

- 3D fire spread predictions are a key resource for forest fire suppression strategy development.

Ⅲ-3. Forest Fire Control System (Response)

➤ Forest Fire Suppression Resources

- **In forest fire suppression, a variety of resources are used for effective and efficient prevention and control.**

	Forest Fire Ranger	Prevention and Suppression Team	Special Suppression Team	Aerial Suppression Team (helicopter rapeller)	General Fire Fighter of local fire station
Main Task	Prevention patrol	Prevention patrol, Ground suppression	Ground suppression in mountain region	Ground suppression in steep mountain region	Protection of private area and facilities
Number of People (Total : 86,974)	11,943	9,604 (1,405 for KFS, 8,199 for Local government)	435	104	64,708
Affiliation	Local government	Korea Forest Service and Local government	Korea Forest Service	Korea Forest Service	National Fire Agency
Duration of employment	6 month (temporary)	6 month (temporary)	Officer	Officer	Officer

➢ Forest Firefighting Resources (Equipment)

	Command Vehicle	Fire Fighting Vehicle	Fire Fighting Equipment (Set)	Personal Fire Fighting Equipment (Set)	Forest Fire Center	Surveillance Camera	Fireplug	Fire Fighting Helicopter	ICT Platform
Total	342	1,394	1,785	38,546	132	1,448	209	194 (KFS, leased, related agencies combined)	6

Helicopters of the Korea Forest Service (2020)

Table 4-5 Data by helicopter model (2020)

Model / Description	X-large(6) S-64	Large(29) KA-32	Medium(2) KUH-1FS	Medium(2) Bell-412	Small(11) Bell-206	Small(11) AS-350
Country (Manufacturer)	USA ERICKSON	Russia KumAPE	Korea KAI	USA BELL	USA BELL	France EUROCOPTER
Passenger	3	18	14(VIP 6~9)	15(VIP 5)	7	6
Max Speed	213km/h	230km/h	287km/h	259km/h	240km/h	287km/h
Duration of Flight	150min	190min	180min	150min	200min	200min
Bucket Volume	8,000ℓ	3,000ℓ	2,000ℓ	1,400ℓ	600ℓ	800ℓ
Time for Bucket Fill	45sec	80sec	50sec	60sec	30sec	60sec
Oil Loadage	5,100ℓ	2,457ℓ	1,473ℓ	1,276ℓ	416ℓ	541ℓ

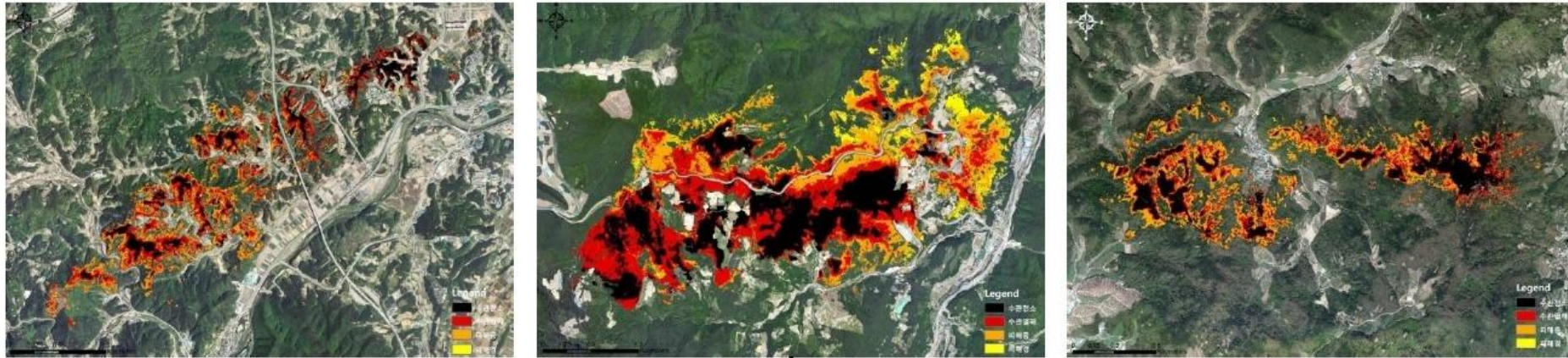**Korea Forest Service (48) and municipalities (73) operate more than 120 helicopters.**
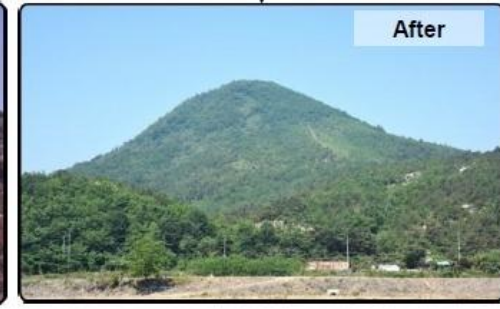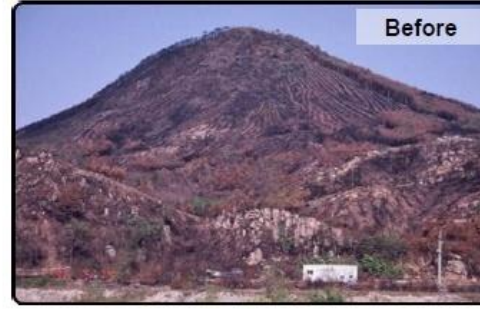
Ⅲ-4. Forest Fire Control System (Recovery)

> ## Post-fire Recovery Programs

- There are two types of post-fire recovery programs: emergency stabilization and long-term rehabilitation.

Forest Fire Damage Estimation using Remote Sensing

Emergency Stabilization

Long-term Rehabilitation

Thank you.

Gwangneung Forest, Pocheon City, Gyeonggi Province