Introduction

Integrated Wildfire Risk Management in Korea

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President, Korea Forest Fire Society

Self Introduction

Forest officer in Korea Forest Service since April 1995 till Jan. 2025

5 experiences in wildfire management (3 times in field operations, 2 times in policy development and management)

- First position in KFS as an instructor on forest fire

- Organizer of the 6th Intl WildFire Conference held in PyeongChang, RoK, 2015

- Director of Forest Fire Div., Head of the Eastern Forest Service

- DG in charge of the Fire Aviation Headquarters

Introduction

- Welcome delegates from Türkiye's General Directorate of Forestry (OGM), Minstry of Finance and the World Bank.

- Today's session introduces Korea's wildfire management experiences.

- I hope this occasion will help share Türkiye's wildfire context and, through mutual exchange, contribute to improving fire management systems in both countries.

Korea's Forest and Fire Context

- Forest cover: 63% of national land; majority coniferous plantations.

- Rapid reforestation since 1970s (15× increase in biomass).

- Challenge: Aging forests and accumulated fuel loads.

- Climate change intensifies spring wildfire risks.

"But the question is — what are we doing about it?"

Major Wildfire Trends

- 2022 East coast wildfire(Uljin–Samcheok), 2023 Central-West wildfire(Hongseong), 2025 South-Eastern mega-fire(Yeongnam).

- Causes: High winds, low humidity, heavy fuel accumulation.

- Pattern: Shorter ignition-to-spread times, faster escalation.E

Korea's Fire Response System

- Central command: KFS Fire Situation Center (since 2000s).

- Aviation assets: 49 helicopters (operated by KFS), with additional capacity through interagency coordination.

- Ground assets: around 10,000 firefighting personnel, 29 high-capacity suppression vehicles(3,500 liters of onboard water storage), etc.

- Ongoing efforts to improve mountain access roads and strengthen local early-response systems.

- Integration of AI-based risk forecasting and satellite monitoring.
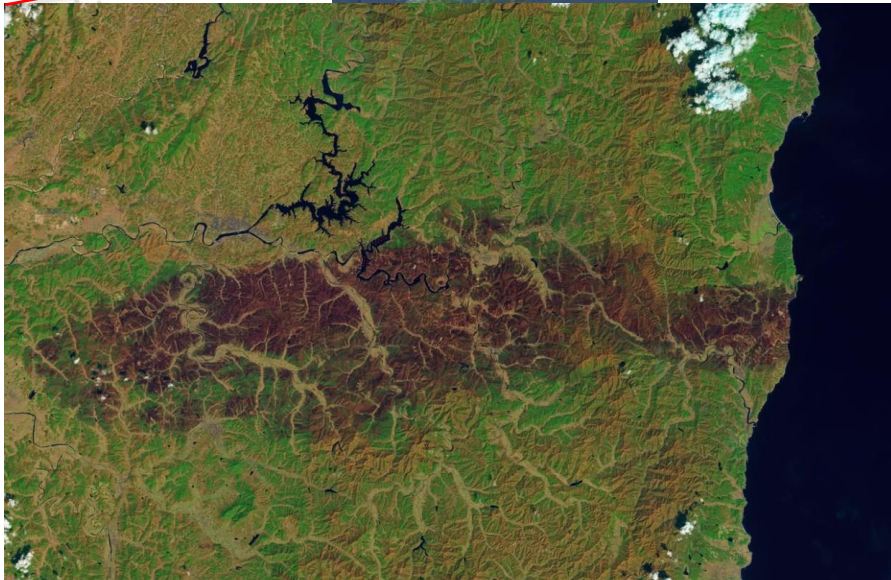
Current Wildfire Response System in S. Korea

Yeongnam Mega Wildfire

🔥 **March 2025: 100,000+ ha burned, 80 casualties, $716 million USD damage.**

Wildfire Response System proposed by S. Korea
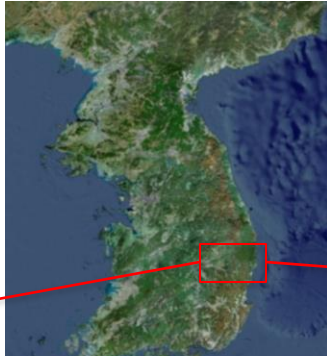
AI-based precision firefighting strategy and evacuation system

Central Wildfire Situation Room
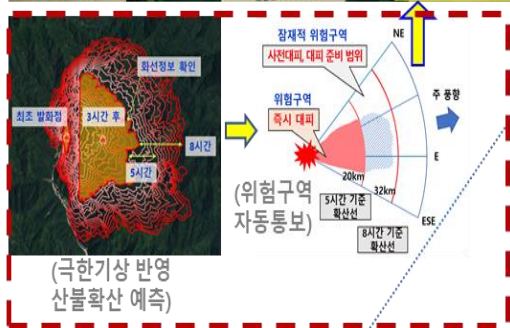
Information sharing among relevant agencies

중앙산불상황실
(산불상황관제시스템)

AI

진화전략 및 주민대피 정보 제공

산불현장대책본부

농림위성

기상위성/환경위성
/수자원위성
/Suomi NPP/
Sentinel-2 등

(화점, 화선, 영향구역 등 정보 공유)

(연무 기반 초기산불 및 대형
산불 탐지 정보 공유)

NE

잠재적 위험구역
사전대피 대피 준비 범위

화선정보 확인

위험구역
즉시 대피

주 풍향

최초 발화점

3시간 후

8시간

5시간

20km

32km

5시간 기준
확산선

8시간 기준
확산선

E

ESE

(극한기상 반영
산불확산 예측)

(위험구역
자동통보)

소형위성

중·고고도드론 **Medium-altitude UAVs**

(산불예방 AI 기반 24시간 감시체계)

(야간진화 및 정보 공유)

(산불허점, 화선 등 정보공유)

(주야간, 열화상)
(산불정보 공유)

헬기/항공기

관계기관

국정상황실

중앙재난안전상황실

해당 지방자치단체

유관기관

KBS 재난방송본부 등

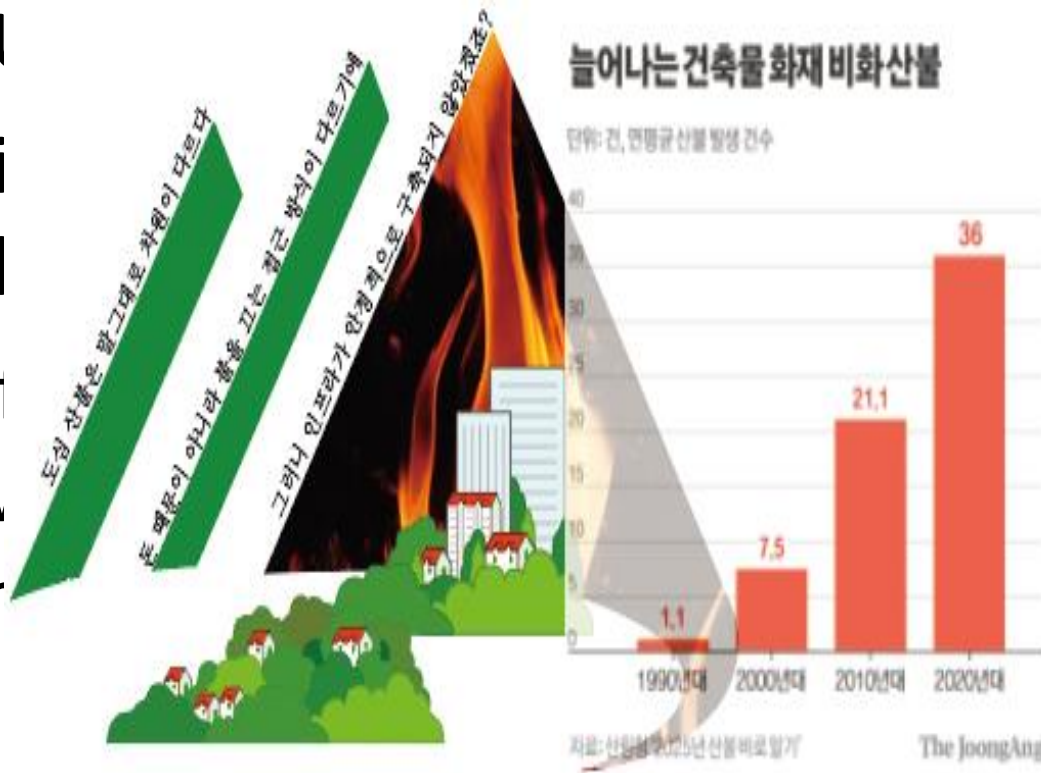**Wildfire spread prediction**

대용량 드론
및 군집운용

지능형 CCTV 및
소형드론
산불 감시

Current National Strategies (from KFS 2025 Policy)

- Strengthen prevention: safety buffer zones, forest roads.

- Modernize technology: heat-sensing drones, early warning AI.

- Expand response: joint air–ground training, night operations.

- Post-fire recovery: climate-resilient reforestation principles.

Managing the Wildland–Urban Interface (WUI) Risk(1/2)

• Around 70% of recent fires occurred within 3 km of WU

• KFS bui   ing AI and satel   .

• Fire-Sa   en Village W   nded to 150 town

늘어나는 건축물 화재 비화산불

단위: 건, 연평균 산불 발생 건수

36
21.1
7.5
1.1

1990년대   2000년대   2010년대   2020년대

자료: 산림청 25년 산불 비로알기

The JoongAng

Managing the Wildland–Urban Interface (WUI) Risk(2/2)

• Future plan: integrate KFS–MOIS(Ministry of the Interior and Safety) evacuation planning and urban boundary zoning with Minstry of Land, Infrastructure and Transportation.

• Enhanced public alert and evacuation route mapping to minimize human casualties.

"Protecting lives begins with readiness in the WUI."

Integrating Climate Factors into Wildfire Management

• Seasonal risk maps updated with temperature, drought index, and wind data.

• Fire Danger Forecast System integrates climate modeling (KMA, Normalized Difference Vegetation Index).

• Post-fire restoration uses climate-resilient species selection.

• A severe drought-linked fire in the Yeongnam region led us to reinforce adaptive wildfire management.

"Climate is not an excuse, but a design input for policy."

Strategic Assets for Fire Management

- Early detection using high-performance UAVs
  - AI-based surveillance and real-time fire alerts.
- Aerial suppression using fixed-wing and retardants
  - Large-scale, day-and-night operations for rapid containment.
- Fuel-load reduction through active forest management
  - Thinning, forest road expansion, and biomass utilization.

"From detection to suppression — and ultimately prevention."

Fuel-Load Management: Key to Prevention

- Forests full of overmature stands; annual growth > harvest 5:1 ratio.

- Excess biomass acts as wildfire fuel.

- Policy goal: Reduce fuel density via thinning and utilization.

- Promote biomass industry, circular forestry economy.

"Yet turning policy into practice remains a major challenge."

Institutional and Field Challenges

- Strong central coordination, but limited local autonomy.

- Need: more flexible on-site command and integration of data to action.

- Any similar challenges seen in Türkiye?.

Practical Barriers to Managing Forests

- Social and Environmental Opposition: "Forest maintenance" and "thinning" are sometimes misunderstood as deforestation.
- Infrastructure Limitations: Insufficient forest roads, Aging forestry workforce
- Policy–Reality Gap: Forests have reached the rotation age, but sustainable harvest and regeneration are delayed.
- Any similar challenges seen in Türkiye?.

International Cooperation and Learning

- June 2025: Visit to Ankara—impressed by OGM's advanced operations and situation room.

- Both nations share similar wildfire environments.

- Collaboration through AFoCO, World Bank, and scientific exchange will be mutually beneficial.

Closing

- Wildfires are growing beyond national boundaries.
- Korea seeks to move from reactive suppression to proactive prevention.
- Your insights during this training week will help strengthen our approach.
- Let's continue this dialogue through exchange of information and training opportunities, etc.

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