



WORKING ON FIRE
20th Anniversary Fire Symposium Programme

Enabling Integrated Fire Management strategies through integrating a comprehensive smart modelling chain into Wildfire Early Warning System

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8-10 Nov
2023

Skukuza Conference Centre in
Kruger National Park

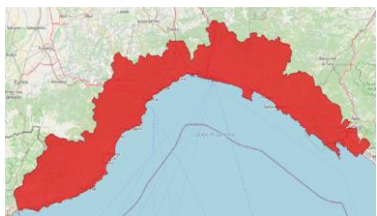


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Rischio Incendi e Coordinamento - RISICO

Fire risk and Coordination

A long story that could be made short(er)...



RISICO started in 2000 as a **Forest Fire Danger Rating System** for the Liguria region...

2000

2003



.... and then expanded nationwide in 2003 and adopted by the **Italian Civil Protection Department**



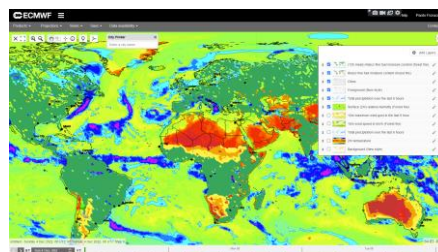
...operationally used to predict severe wildfire events within the MH ARISTOTLE service

The model is **continuously updated**...



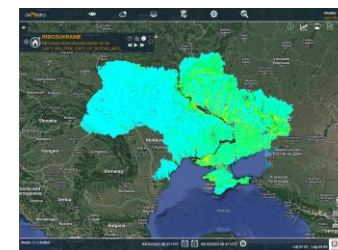
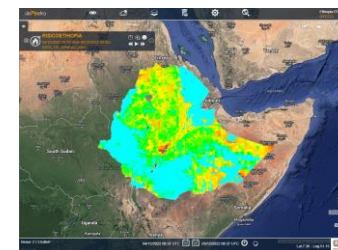
2007 - 2009 - 2011 - 2015 - ...

...and it is under test in EC Chart (ECMWF)



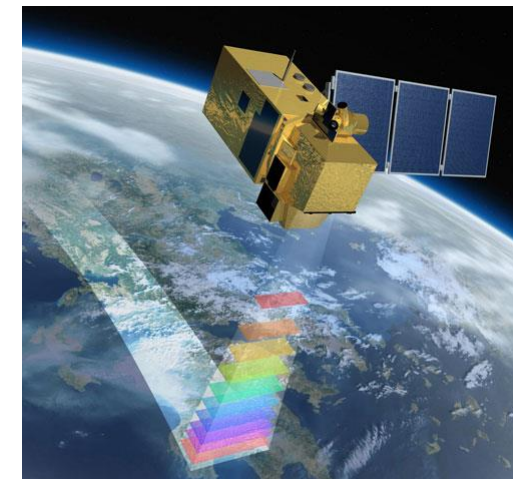
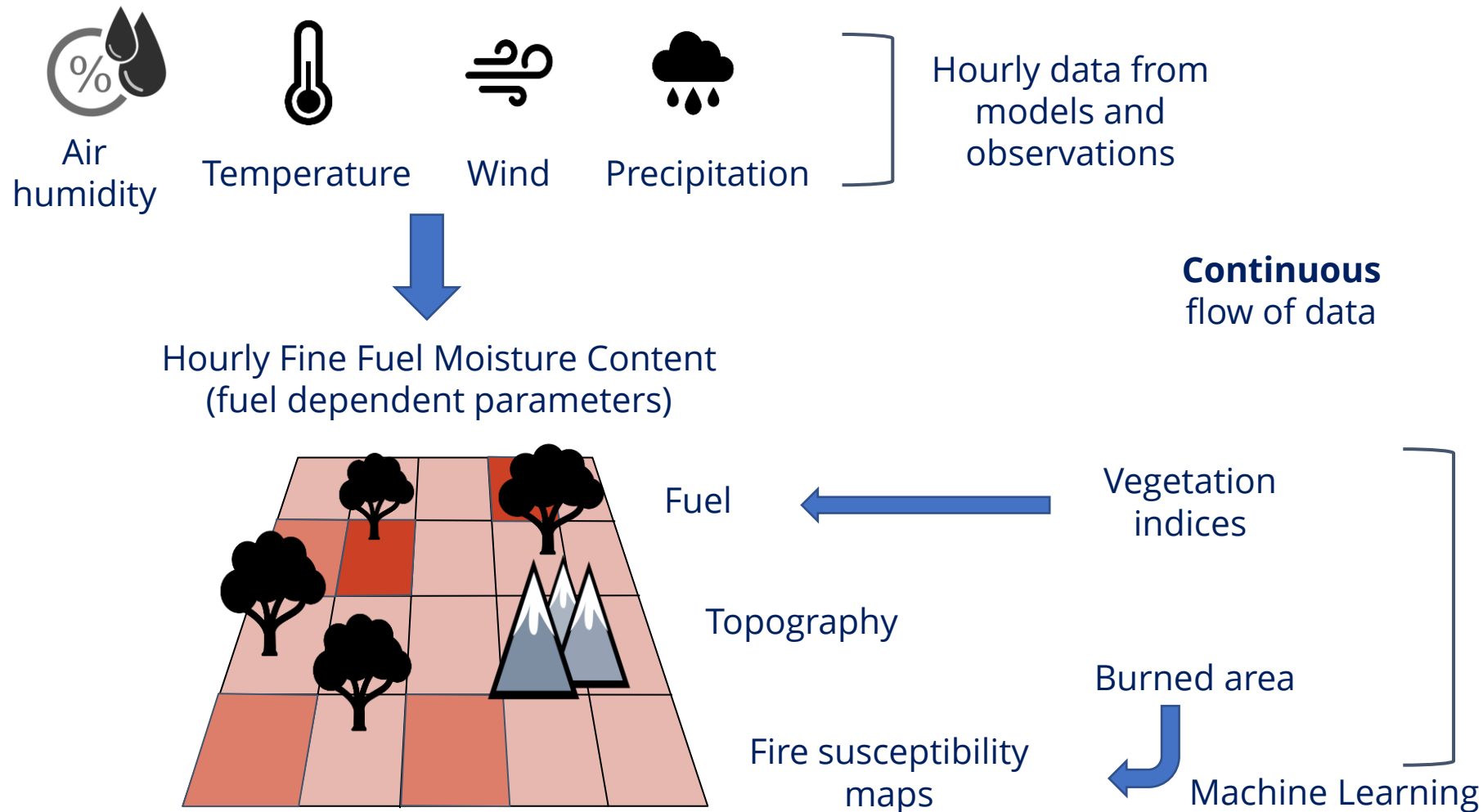
At present, RISICO is a **well-proven system** continuously updated to be adapted to operational needs

...and it is operational in several countries including Bolivia, Ethiopia, Ukraine, Moldova, Georgia, Armenia, etc.



Rischio Incendi e Coordinamento - RISICO

WildFire risk and Coordination



What is behind it?

RISICO MODEL STRUCTURE

INPUT:

- DYNAMIC DATA
- STATIC DATA

Meteorological data
Models (forecast) + weather stations
(observation)

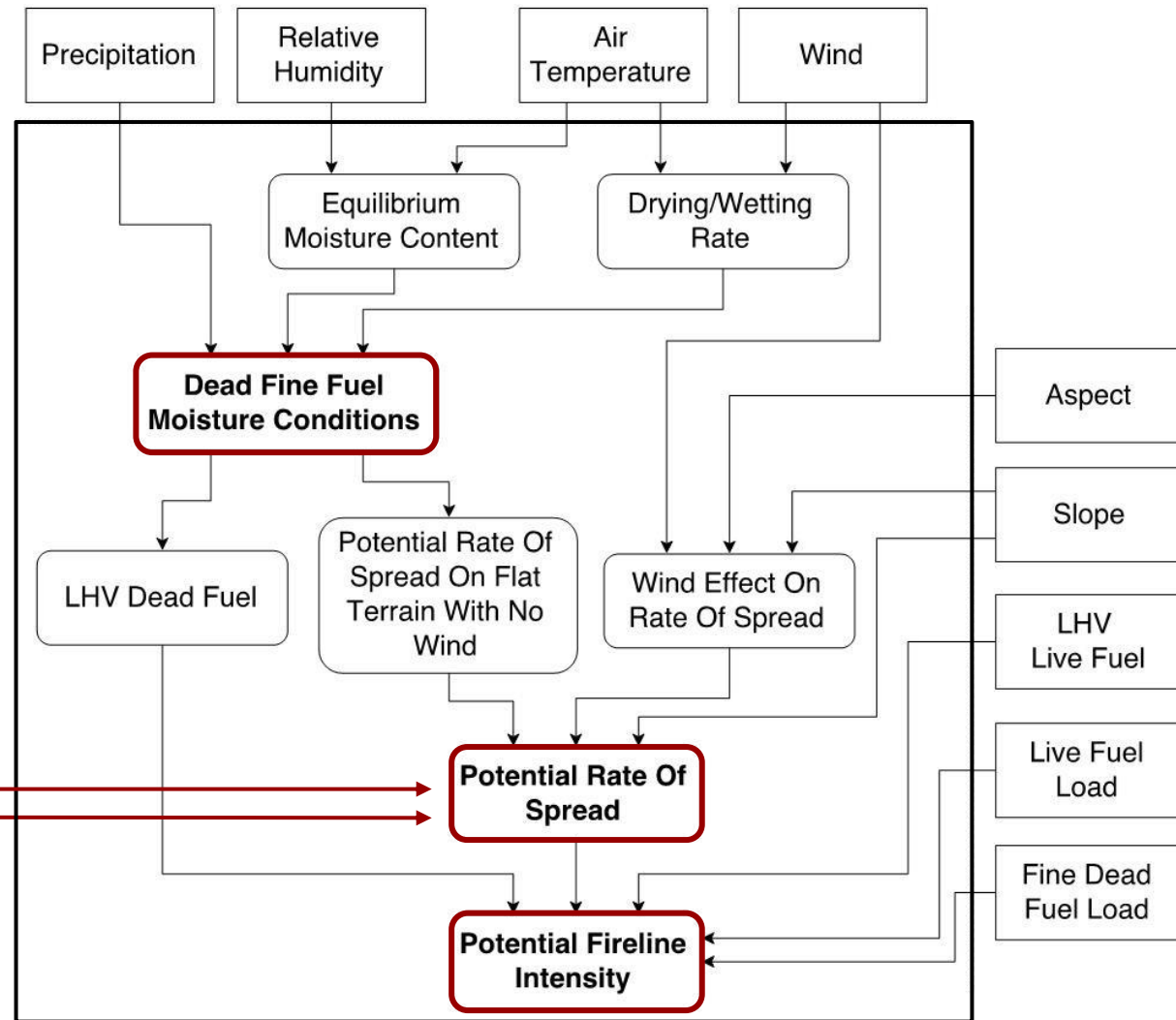


From **2019**
(Sentinel 2)

**Vegetation
index**



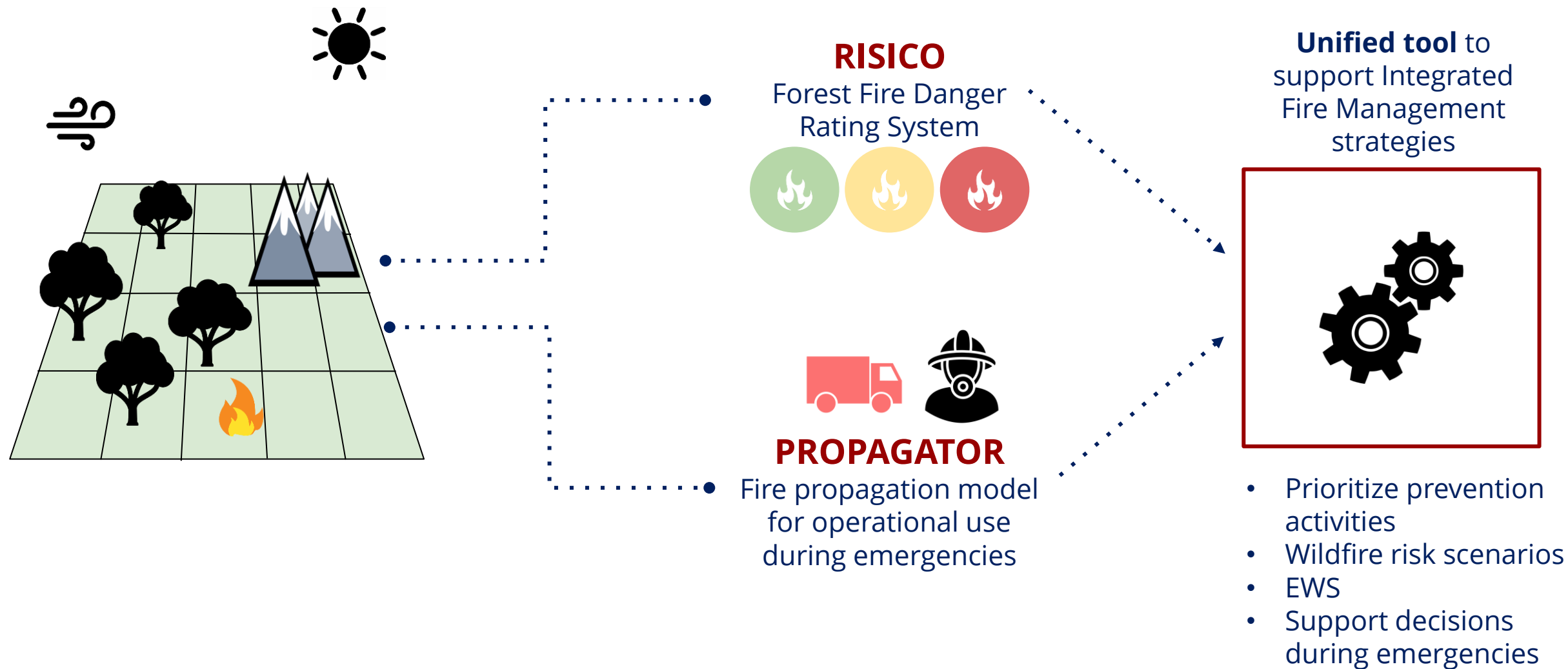
**Fire
susceptibility
map**



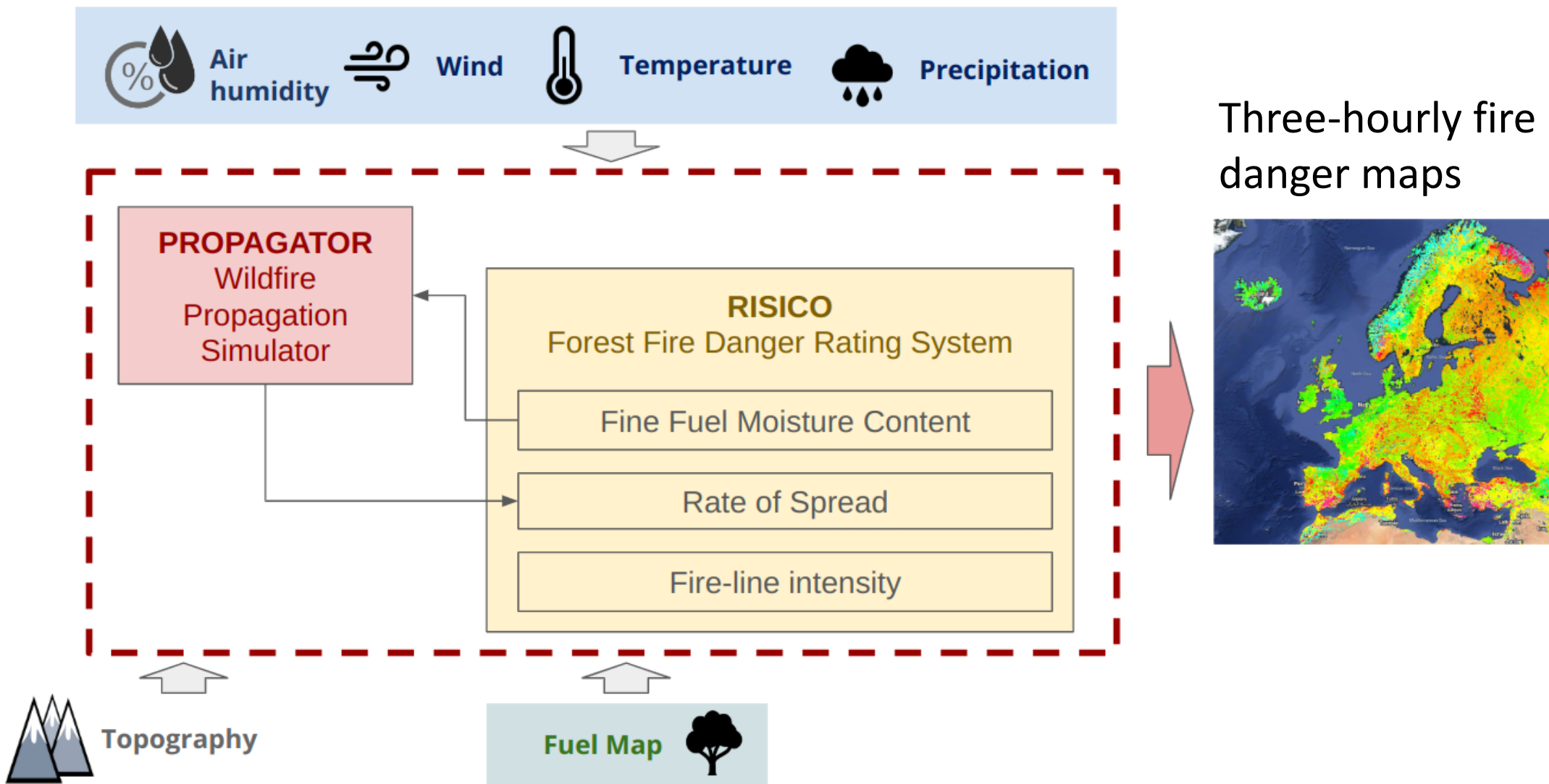
Topography

**Fuel data
(vegetation)**

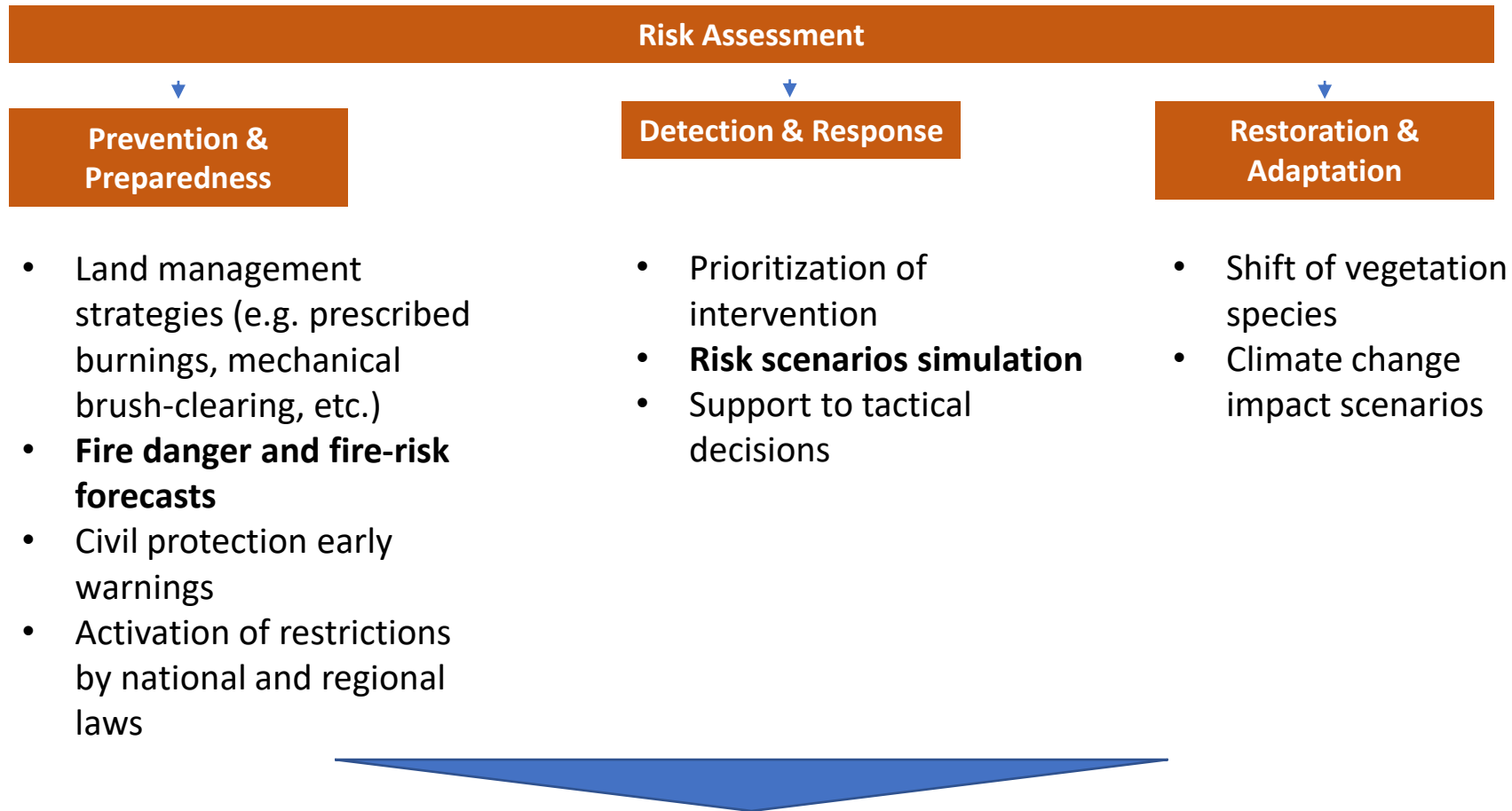
RISICO and PROPAGATOR



Fire Danger&Risk Forecast



Potential applications



Enabling Integrated Fire Risk Management Strategies (IFM)

Disaster Risk Reduction Capacity Building in Ethiopia: development of an information management system for early warning for forest fires in Ethiopia



Implementation of:

RISICO Ethiopia, EWS for Forest Fire

Hazard maps at national scale

AI-powered semi-automated Forest Fire EW Bulletin at national scale

ML helped in detecting the fire prone areas with analysis of geospatial datasets

Definition of SoP for districts with high forecasted danger

FOREST FIRES IN ETHIOPIA

A Challenge We Must Take Up



WILDFIRE LIKELIHOOD (WOREDA AGGREGATION)

CLIMATE PROJECTIONS ESTIMATE
A RISE IN TEMPERATURE OF 1-2 °C
IN THE NEXT 30 YEARS

AND INCREASED VARIABILITY IN RAINFALLS

LIKELY INCREASING
THE RISK OF FOREST FIRES

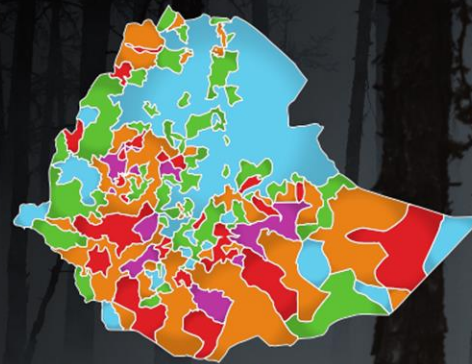
Wildfires affect nearly every ecological zone in Ethiopia



13%
Forest coverage
in 1990



11%
Forest coverage
in 2010



POTENTIAL SEVERITY OF FOREST FIRES



The main cause of fire ignition is human activity during agriculture practices: before crop cultivation, stimulate new growth of grass for grazing animals, disinfestation, fumigate traditional beehives placed on the branches of trees to collect honey and to make charcoal.

FOREST FIRES CONTRIBUTE TO DEFORESTATION



Soil Erosion



Loss Of Soil Nutrients



Reduction In Biodiversity



Loss Of Animal Habitats

Implementation of:

RISICO Ethiopia, EWS for Forest Fire

Hazard maps at national scale

AI-powered semi automated Forest Fire EW Bulletin at national scale

ML helped in **detecting the fire prone areas with analysis of geospatial datasets**

Definition of SoP for districts with high forecasted danger



RISICO
ForestFire
Early Warning System

Forest Fire Early
Warning bulletin
(FFEWB)

Thrice Weekly

Multi-agency

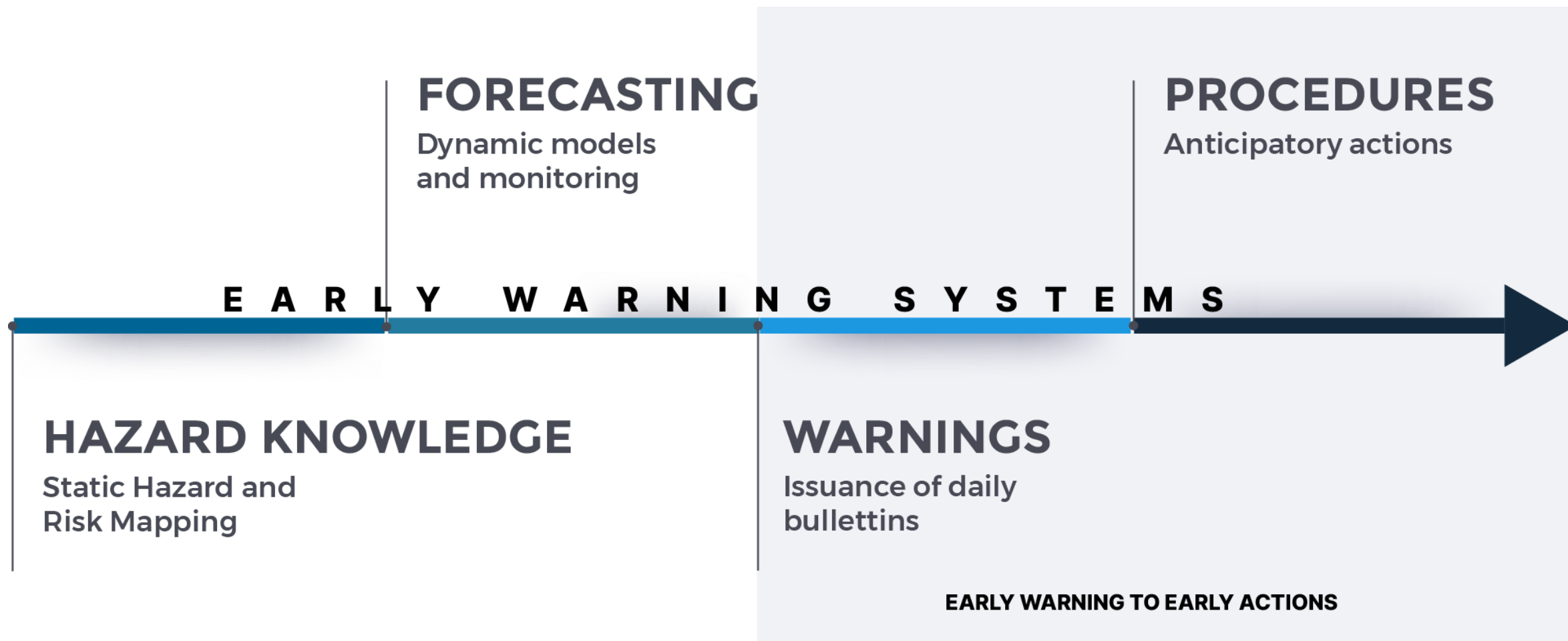
Wereda scale

Semi automatic

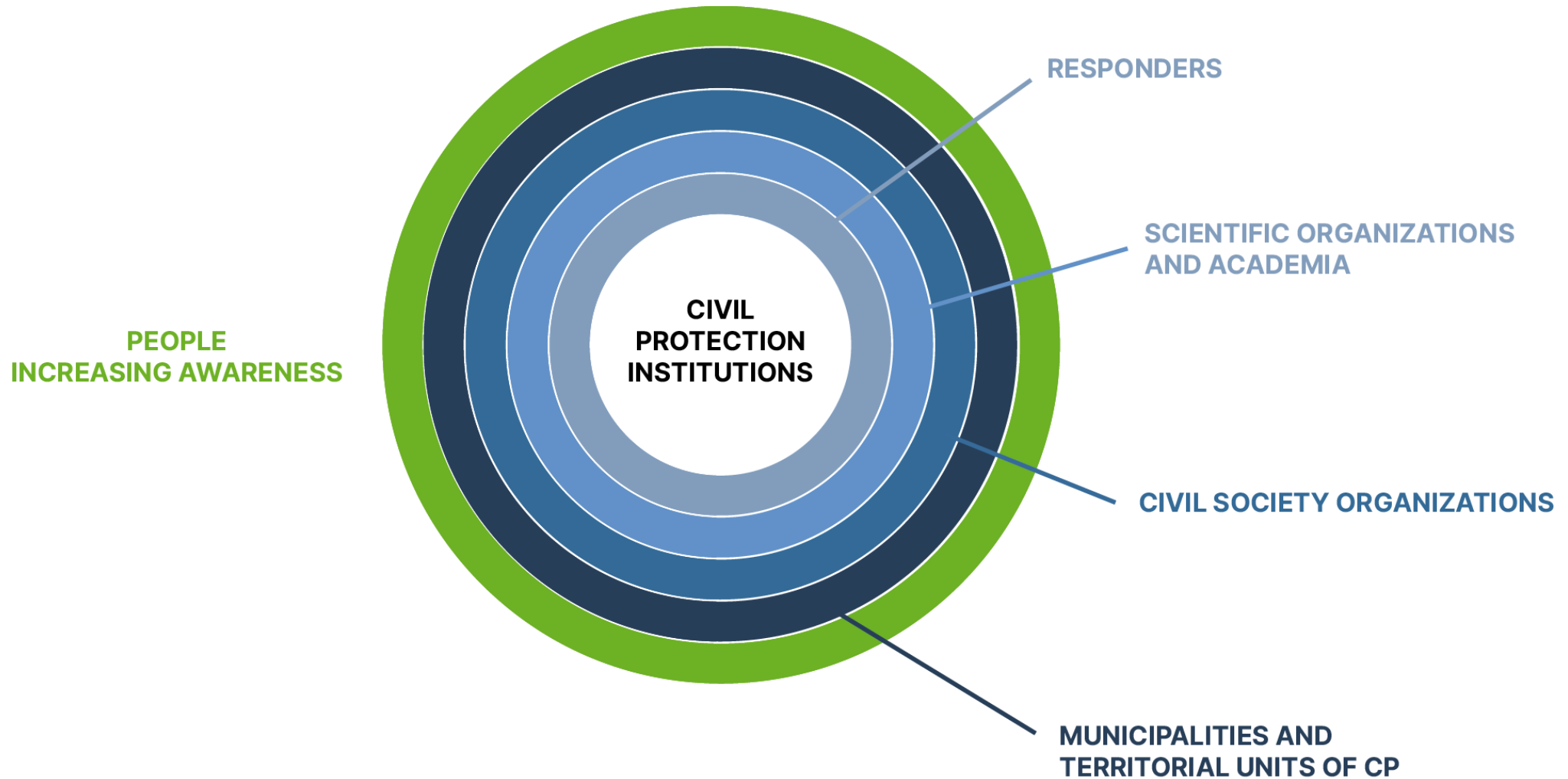
Using RISICO model +
AI enhancements



Integrating EWS with EWEA strategies

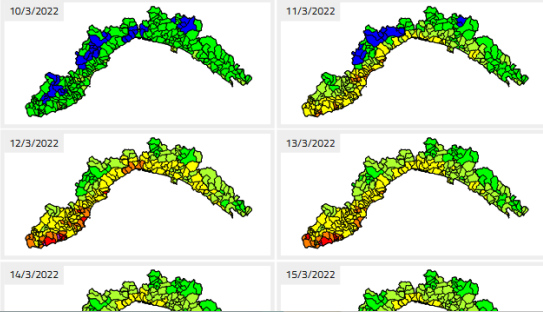


Needed actors in a complex system



Standard Operating Procedures

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Information

A significant part of the district is subject to high fire danger

...into legal framework

Ministero dell'Interno
DIREZIONE REGIONALE DEI VIGILI DEL FUOCO, DEL SOCCORSO PUBBLICO E DELLA DIFESA CIVILE DELLA LIGURIA
Ufficio Servizio AIB

OGGETTO: Incendi boschivi. Potenziamento dispositivo di intervento AIB.

MESSAGGIO DI POSTA ELETTRONICA

Da	Salvo Operativa Regionale	dir.salvo@regione.liguria.it
A	Comando Vigili del Fuoco Imperia	com.salvo.imperia@vigilfuoco.it
A	Comando Vigili del Fuoco Savona	com.salvo.savona@vigilfuoco.it
A	Comando Vigili del Fuoco Genova	com.salvo.genova@vigilfuoco.it

R.l.

A.C.O.N. - Roma
Al F. Dir. AIB Ernesto Crescenzi
Al Funzionario Responsabile SOUP
Al Funzionario referente AIB della Regione Liguria
Al Referente Regionale FOS

A seguito di specifiche indicazioni in particolari situazioni di emergenza con probabilità sopra al 15%, fornite dal bollettino SPIRL, a lungo termine, relativamente alla provincia di Savona.

TENUTO CONTO

- che, in una più estesa valutazione del rischio d'incendio, intervergono ulteriori parametri riferibili al permanere dello stato di sicurezza dell'ambiente naturale boschivo,
- che è previsto un innalzamento dell'intensità dei venti,
- che è possibile un incremento della presenza antropica.

SI RITIENE opportuno potenziare il dispositivo di soccorso ordinato dei Comandi liguri e pertanto si dispone in attuazione della "Convenzione" in essere con la Regione Liguria - il richiamo in servizio dedicato AIB di personale aggiuntivo dei Comandi come di seguito indicato.

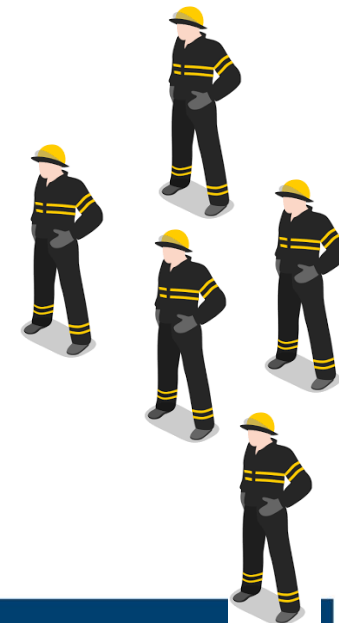
Giorni	n.1 BOS + antenna (2 unità)	n. 1 squadra YVE (5 unità)	n.1 spezzatore primo Sala Operativa Comando Provinciale
24.11.2020	Imperia - Savona - Chiavari	Savona	Savona

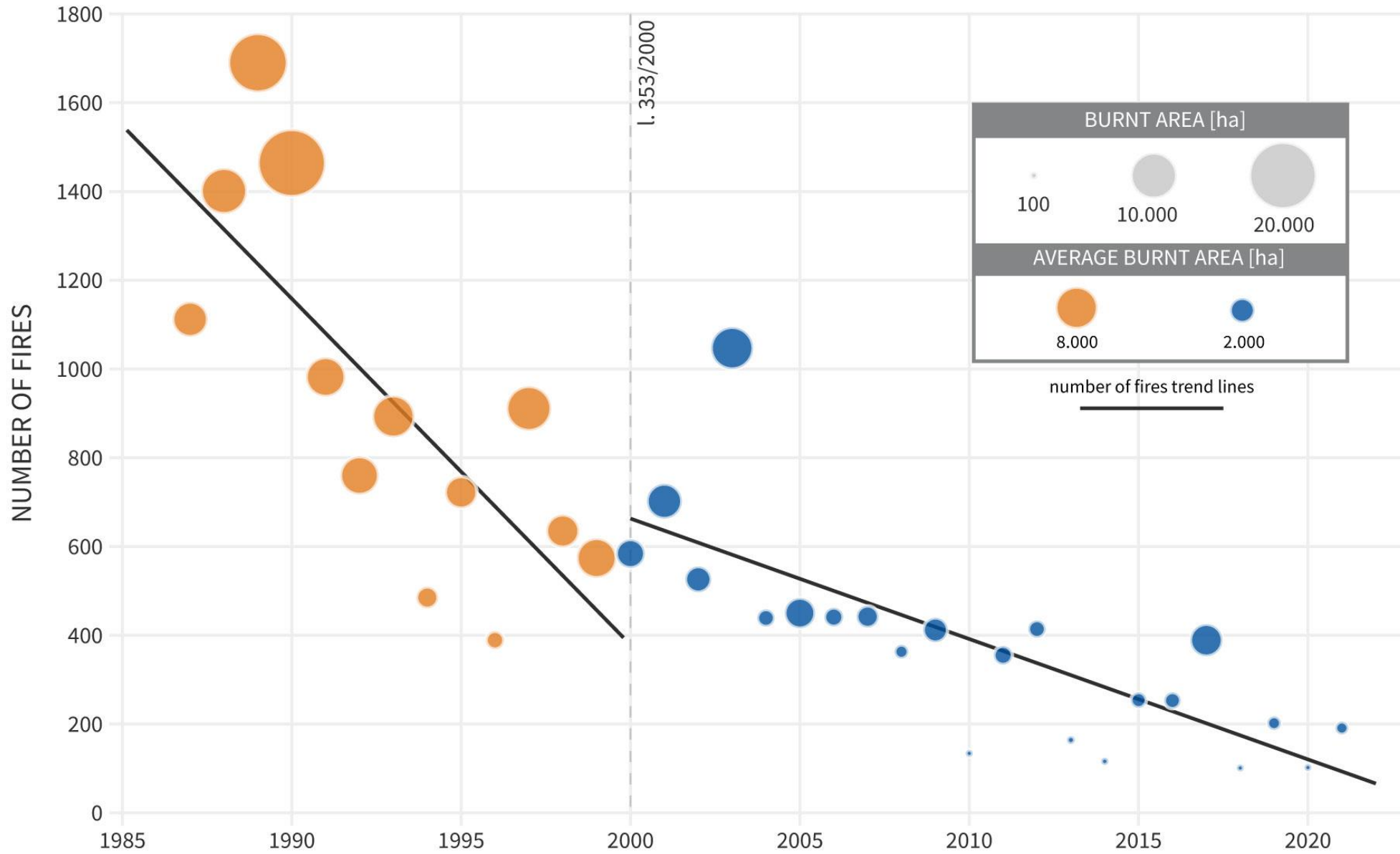
.. into Action

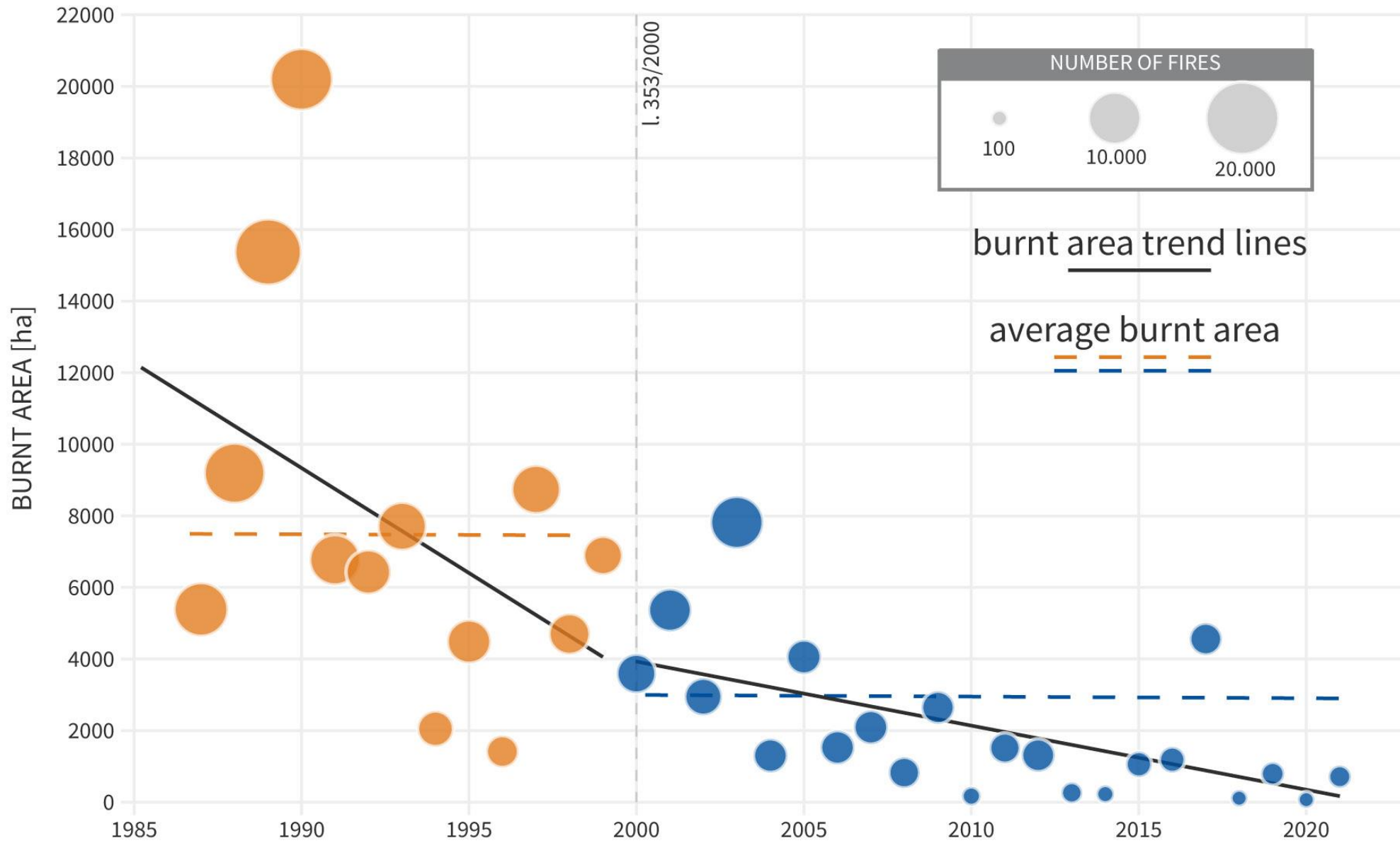
One or more firefighting operation manager available



One fire fighting module ready to start







Conclusion

- The effects of Wildfires can be greatly mitigated by making landscapes more resilient
- Prevention needs strengthening through:
 - forest management
 - land-use regulations
 - Planning future resilient landscapes
 - reducing anthropic pressure on forest interfaces
- Those actions need time
 - Need to anticipate climate change impact, including CCI scenarios

Conclusion

- Early Warning Systems play a fundamental role if supported by relevant actions:
 - Reliable **risk assessment and risk mapping**
 - **Early detection** through monitoring of specific areas, identified by forecasting models
- Preparedness needs strengthening through:
 - Identification of needs and **prioritization of actions**
 - Definition of a legal framework focusing on **anticipatory actions**
 - Involvement of **relevant stakeholders**
 - **Trainings**
- Increasing population awareness is essential
 - To reduce events caused by negligence
 - To reduce the overall impact on people's lives, the environment, properties.



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