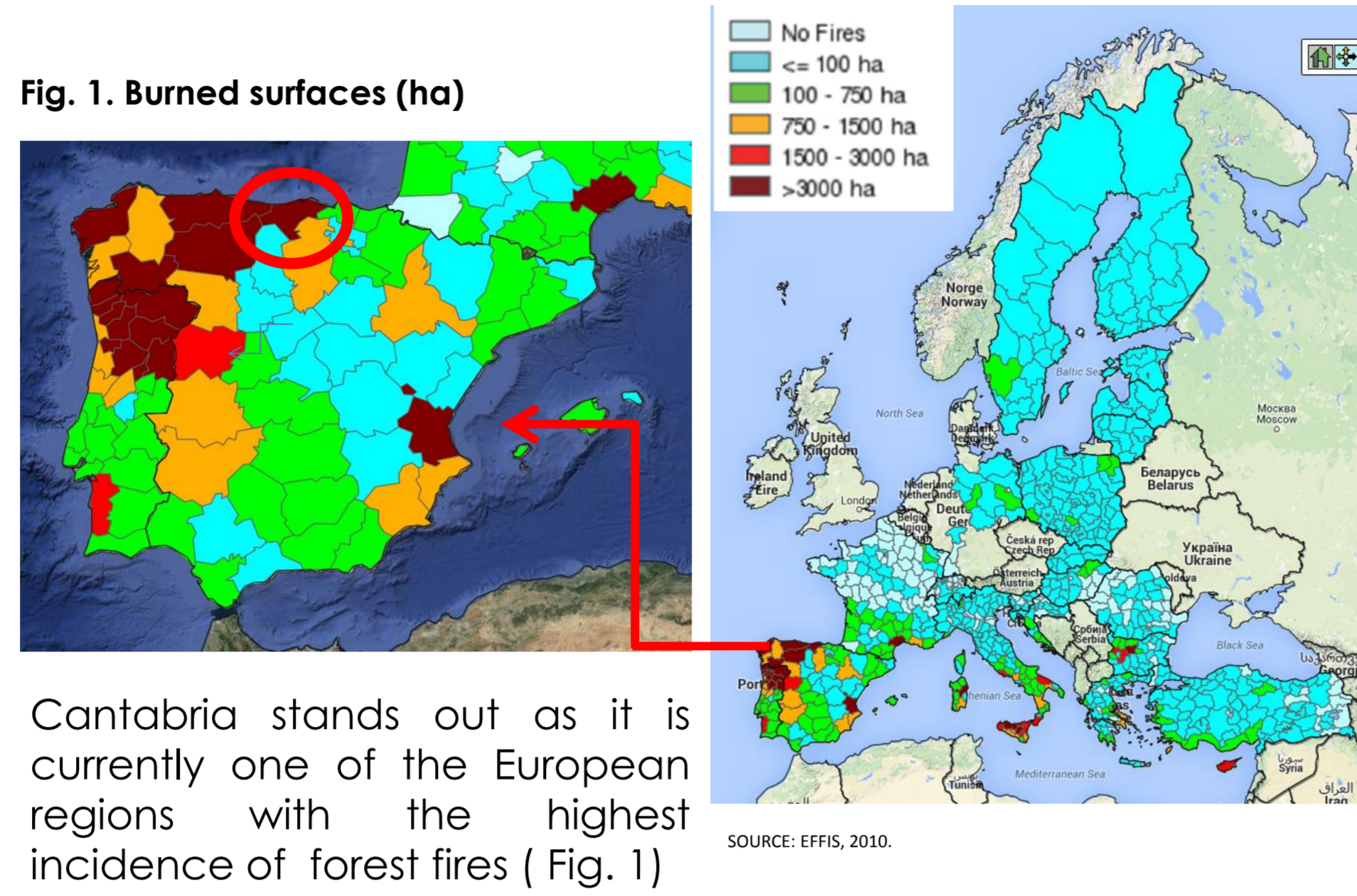


### OBJECTIVES

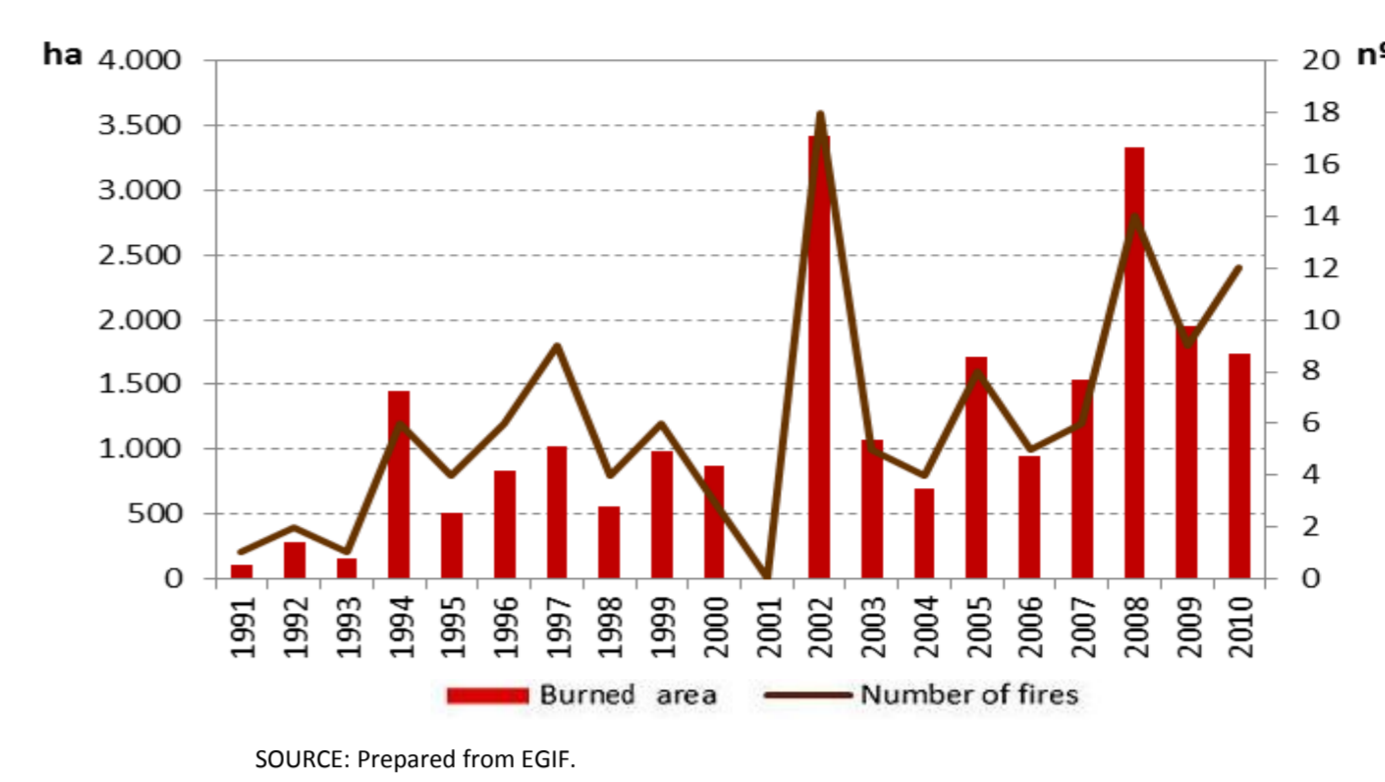
- ❖ Identify the distinct types of fires and their aims from prehistory to the present day.
- ❖ Determine the possible relation between historic fires and present day ones.
- ❖ Improve knowledge of past and present day to guide their future management.

### INTEREST

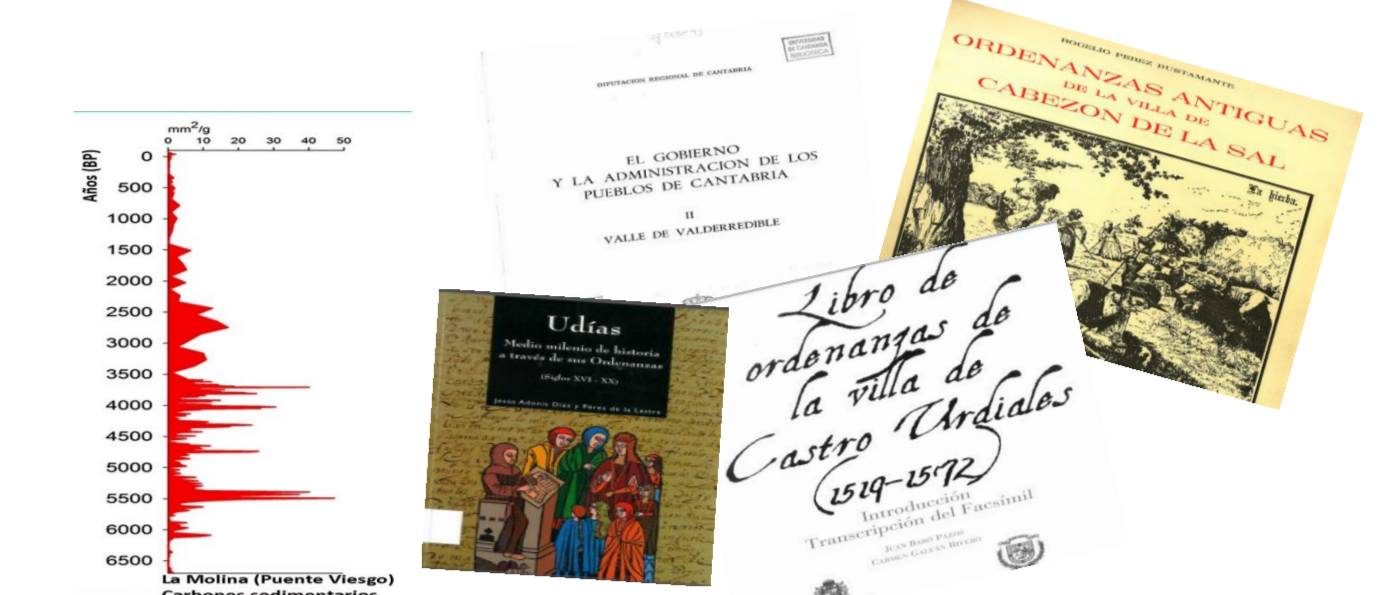


The importance of improving management is not so much due to the large number of fires or the large surface area affected, but because we have found that the largest and most destructive fires are increasing alarmingly in number (Fig.2)

**Fig. 2. Wildfires ≥ 100 ha and burned surfaces (ha) (1991-2010)**



**Fig. 3. Examples of documents that have been used**



The detection of seasonality, uses, or similar motivations between historical and modern day fires, detected thanks to the large amount of documentation consulted (Fig.3) –which also confirms how old the use of fire is in the region–, has led us to identify the importance of knowing the evolution in the use of fire in the region throughout history in order to improve its management.

### METHODOLOGY AND SOURCES

The length of the considered period, from prehistory to the present day, greatly conditions the availability of useful sources for the study of fires. Thus, while in the oldest period we have no option but to resort to indirect sources, as history advances the sources become more abundant and reliable.

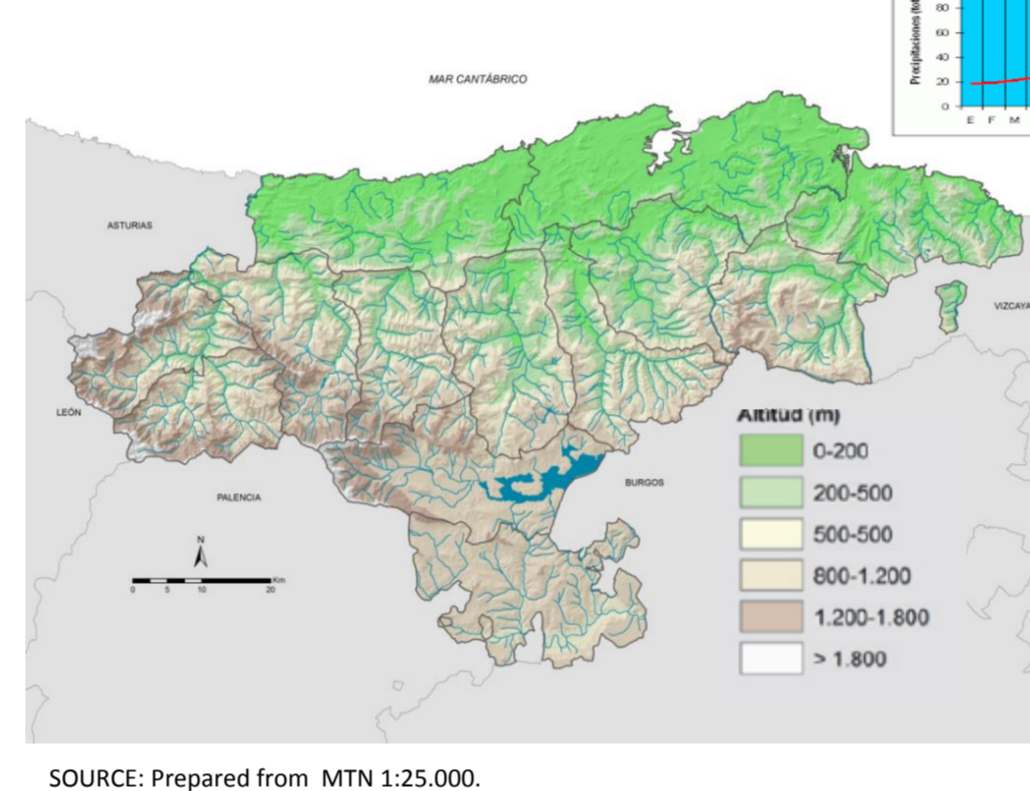
#### Phase 1: Compilation, classification and analysis of sources (direct and indirect)

- Pollinic and sedimentary carbon analysis (samples in three peat bogs and compilation of other previously performed studies).
- Bibliography and historic ordinances (more than 200 documents and standard-setting instruments - Ordinances, court cases, laws...- from the 15<sup>th</sup> to the 20<sup>th</sup> centuries).
- Bibliography and forestry and fire ordinances of the 21<sup>st</sup> century and forest fire statistics (1961-2010) of Spain and Cantabria.

#### Phase 2: Interpretation of data, classification of fire types and evaluation.

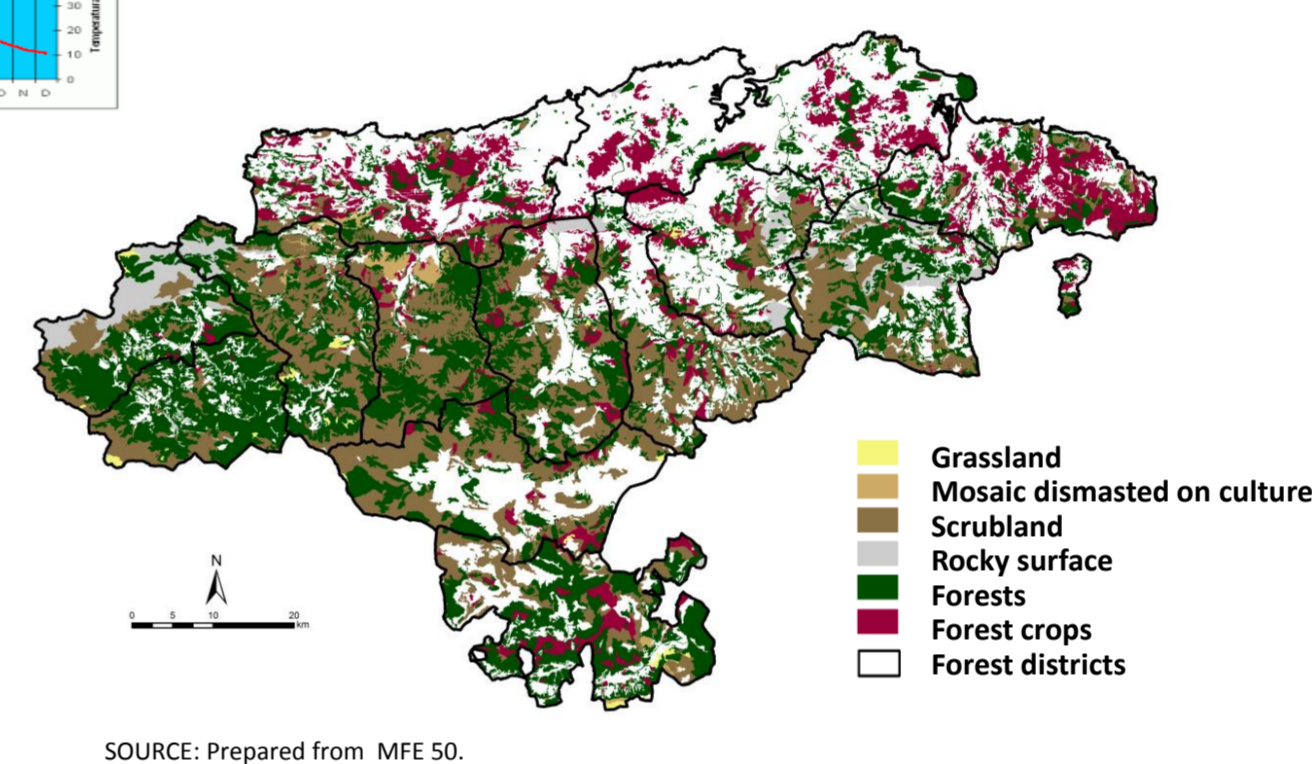
Cantabria is a predominantly mountainous region (Fig.4), typified by steep slopes and the oceanic climate with mild temperatures and abundant precipitation throughout the year.

**Fig. 4. Topographic map**



2/3 of the surface of the region is forested (Fig.5) -autochthonous deciduous woods, scrubland and pasture in the hills and plantations of pine and eucalyptus near the coast- which means that most of the region can suffer forest fires.

**Fig. 5. Different types of forest lands**



Except near the coast and in the principal towns of the municipal areas, most of the region is rural, in which the primary sector (cattle) predominates, with a sparse and aging population and marked abandonment.



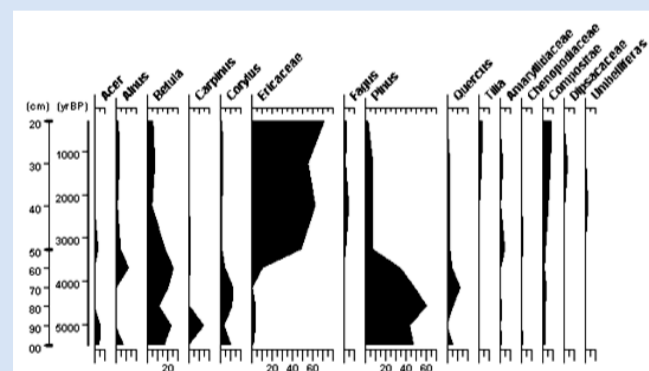
### RESULTS

**PALEOLITHIC: Survival fire.** It is believed that, as has been demonstrated in other places, fire could have been used as a technique for **hunting** (Fig. 6).

**Fig. 6. Aboriginal hunting with fire in Australia**



**NEOLITHIC: The fire of the first vegetable and livestock farmers. First plowing and conditioning of pastures.**



Pollinic analyses show a sharp descent in the arboreal pollen at the same time as an increase in the non-arboreal pollen.

Analysis of the sedimentary carbons in the sample extracted from the peat bog of La Molina (Puente Viesgo) demonstrates that the number of fires, very scarce until that time, rose sharply from 6,200 cal BP –the oldest evidence of the development of agriculture in the Northern Spanish coastal strip is a grain of cereal dating from 4,400 years BC.- and maintained their maximal intensity throughout more than two millennia coinciding with the Neolithic and Bronze Age.

SOURCE: García Codron et al., 2014.

**ANCIENT HISTORY AND MIDDLE AGES: Fire as a tool in the configuration agricultural and livestock spaces.**

Although these are the least documented periods, there is sufficient indirect information to presuppose that the use of fire in the **plowing for crops** and for **conditioning the livestock spaces** that, in these periods become more and more important.

**MODERN AGE:** From the 15<sup>th</sup> century, there is abundant written documentation -ordinances, court cases,...- that confirm the constancy of the use of fire, its characteristics and its problematic.

**Livestock fires for creating and conditioning pastures.** The growth in population and advances in agricultural systems lead to more intensive livestock farming, associated to new extensions of the spaces for pasture where fire is the principal tool used. The regulations about the use of fire to avoid its uncontrolled spread or unnecessarily affecting woodland, and the punishment for whomever is responsible for allowing the necessary burning-off to become what we now refer to as wildfires.

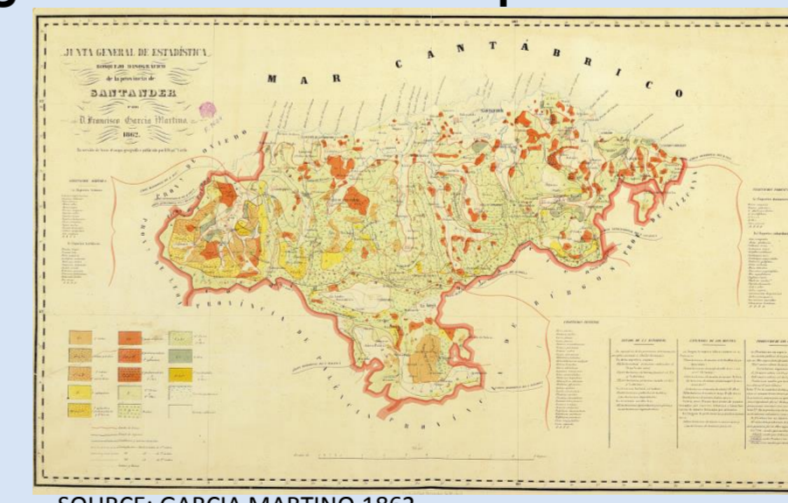
**Most frequently detected Situation:** Traditional fires(with permission) in winter set by shepherds and cattle farmers to regenerate the pastures before bringing the livestock up to the hills in the spring and fires (without permission) very often related to the bans imposed by the Crown which reserves large areas of the hills for forestry purposes.

**MODERN ERA:** The regression in the forested spaces highlights the need to regulate the uses of the hill lands.

**Deforestation and regulation of fire practices.** The degradation undergone by the forested surfaces throughout the country led to promulgation of tens of norms in which the preoccupation about fire is patently obvious.

**Principal regulations:** persecution of fire setters; delimitation of burnt zones; defense and prevention of fires; obligation to reforest the burnt area; prohibition of pasture use in burnt zones

**Fig. 7. The first forest map of Cantabria**



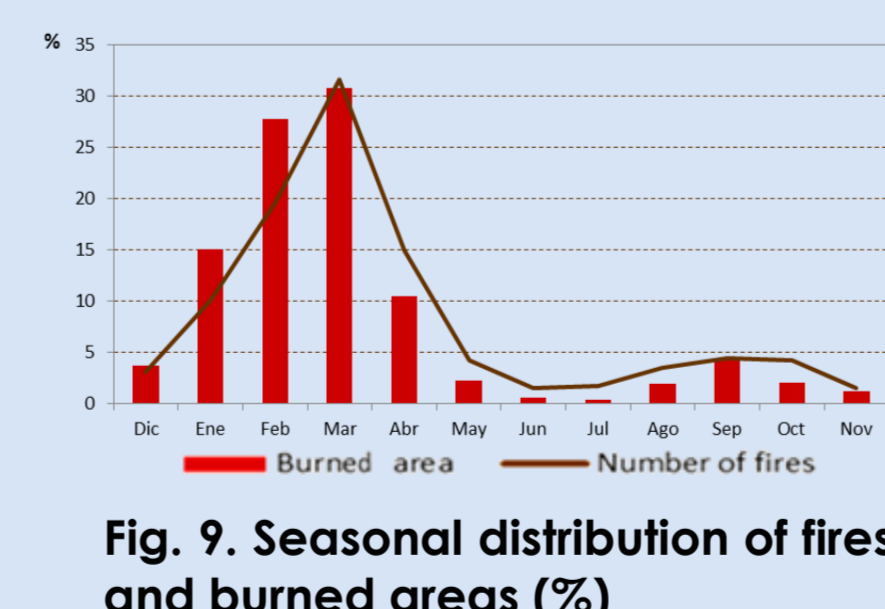
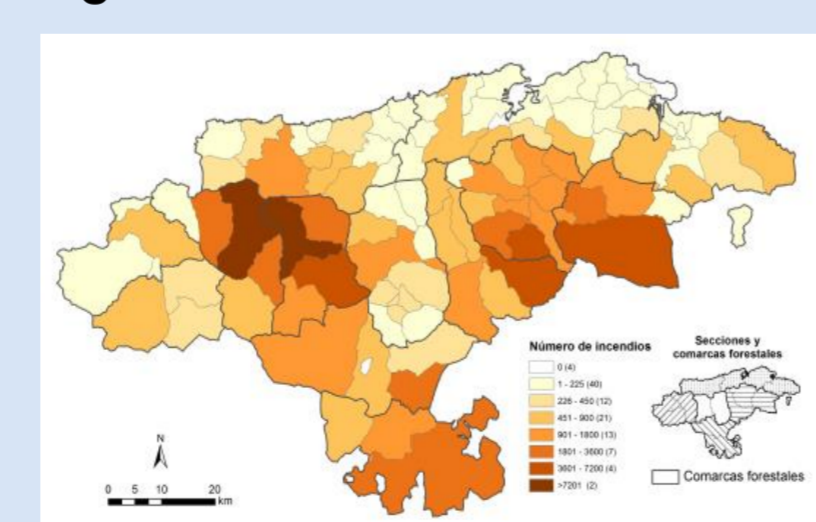
**The preoccupation for livestock-related fires persists and is confirmed in many historic documents**

Publication of 1879 "(...) now is the time that fires are usually set in the public hills of this province, fires that are the offspring of the greed of a few cattle farmers and the benefit of shepherds"

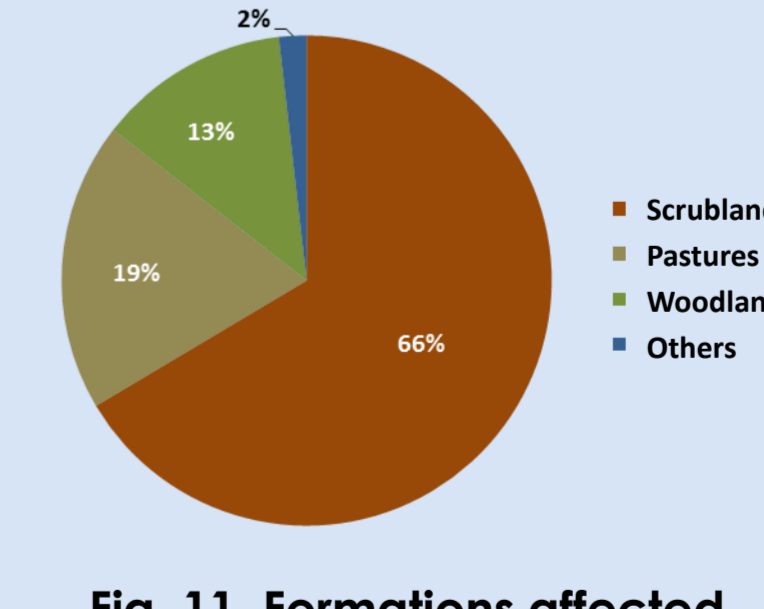
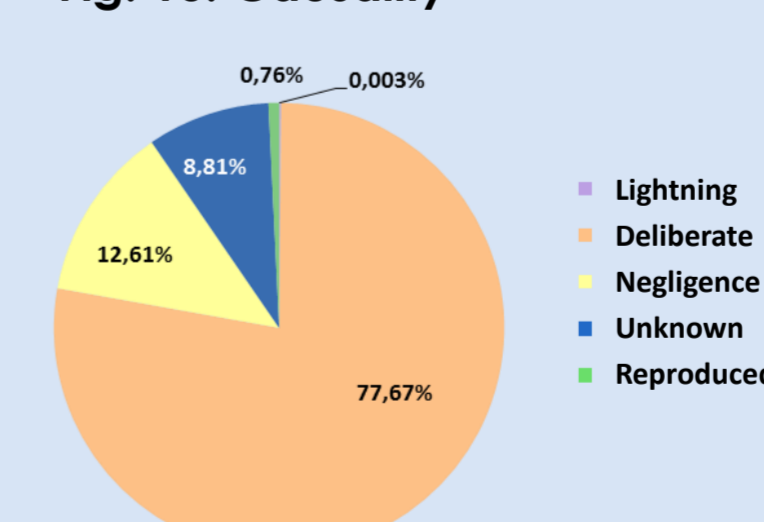
The economic reorientation toward dairy farming taking place at the end of the 19<sup>th</sup> century led to **pasture creation in most of the land through fire.**

**PRESENT DAY:** Current analysis of fires is based on the information from the **Estadística General de Incendios Forestales (EGIF)**, (General statistics on Forest Fires) started at the end of the 1960s and considered to be among the world's best.

**Fig. 8. Number of fires**



**Fig. 10. Causality**



Protection of biodiversity implies a greater limitation in the traditional uses of hill lands.

### CONCLUSIONS

- ❖ Fire has been used and permitted throughout most of our history, first as a tool for subsistence and later as a tool for creation and maintenance of spaces for agriculture and livestock.
- ❖ Once the resources of the hill lands (timber, resistance to erosion, biodiversity, climatic change...) became known and valued, the regulation and prohibition of the use of fire started, which, both historically and also currently, has been done through imposition by the Administration with the opposition of the rural population, without consensus.
- ❖ Cantabria is currently one of Europe's most fire-affected.
- ❖ Cattle farming is the principal activity in the hill land zones and fires for the maintenance and access to pasture land are still being used in the present day.
- ❖ Forest fires are mostly unauthorized burn-offs, related to the loss of skills in the use and handling of the hill lands by the rural populations, which suffer depopulation, aging and who undergo greater and greater regulation related to protection of natural habitats.

### BIBLIOGRAPHY

Carracedo Martín, V. (2015). *Incendios forestales y gestión del fuego en Cantabria*. Santander: Universidad de Cantabria, Departamento de Geografía, Urbanismo y Ordenación del Territorio. Disponible en: <http://www.tdx.cat/handle/10803/299198>

Please, find more information on posters C5 & D37:

- Carracedo, V. et al.: Burning and wildfire in rural culture: the Nansa valley (Cantabria, Northern Spain)
  - G. Codron, J.C.: Reconstructing the history of fires in Northern Spain. Methodological considerations from a multi-proxy approach
- And at [http://www.gimena.unican.es/entrada\\_eng.html](http://www.gimena.unican.es/entrada_eng.html)

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