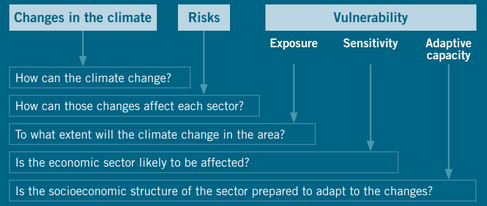
HOW HAS THE VULNERABILITY OF EACH SECTOR BEEN EVALUATED?

The vulnerability study has focused on the agricultural, livestock, forestry and tourism sectors. The identification of the principal risks that affect each sector has been carried out through the collection of technical information and interlocution with the various social and economic groups within the region.

A set of indicators has also been established for risks that are considered to be the most important for each sector, municipality and the region as a whole. The vulnerability associated with a particular risk has been calculated based on the following variables: exposure, sensitivity and adaptive capacity.



LIFE CLINOMICS
LIFE15 CCA/ES/000102
"This project has been funded with support from the European Commission"

The European LIFE CLINOMICS project **has selected three regional areas of Catalonia,** each with ecosystems representative of the country as a whole in order to analyse and evaluate the vulnerability and impacts each region faces from climate change.

The information should allow:

- The adaption/modification of **local socio-economic policies and activities**.
- Catalonia to serve as a **replicable model** in other Mediterranean areas of southern Europe.

Access to the technical report: **http://lifeclinomics.eu/en/informes**

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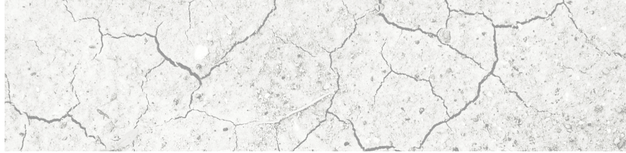
THE VULNERABILITY OF THE AGRO-LIVESTOCK SECTOR TO CLIMATE CHANGE



THE LIFE CLINOMICS PROJECT OF CATALONIA AND THE ADAPTATION OF THE REGION TO CLIMATE CHANGE

Adapting to climate change is a **collective challenge**.

It calls for a **shared effort** on the part of all social and economic agents, organisations, groups, and public institutions, in all sectors and at all levels.

It is no longer enough to avoid further emissions; we must also work to reduce or mitigate the emissions that we produce now.

Given the seriousness of the predicted **inevitable impacts** of climate change, each geographical region must also take measures that will allow it to **adapt to the changes to come** (resilience).

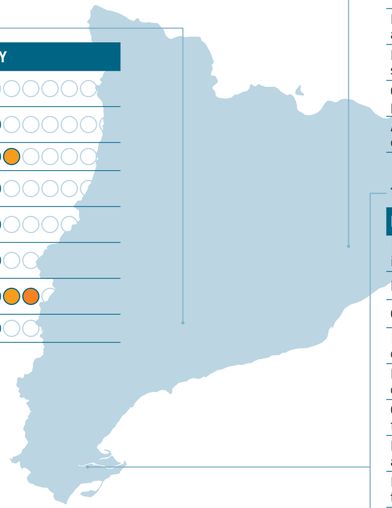
Therefore we must...

Minimize **vulnerability** to **risks and negative impacts**

Identify **positive impacts** and transform them into **opportunities for all sectors and regions**

Therefore, we must promote adaptive measures for all economic sectors in order to guarantee their **sustainable activity in the new climate scenario.**

WHAT IS THE LEVEL OF RISK TO THE SECTOR IN EACH REGION?



ALT PENEDÈS

RISKS	VULNERABILITY
Increased demand for irrigation in agriculture	2.9
Fire risk in the agricultural sector	4.6
Changes in crop types	5.2
Decrease in the quality of groundwater	4.5
Reduction of grassland and pasture	4.1
Changes in the surface area and productivity of vineyards	4.3
Decrease in the flow rate of rivers and streams	6.0
Loss of biodiversity	4.2

MONTSENY

RISKS	VULNERABILITY
Increased demand for irrigation in agriculture	2.4
Fire risk in the agricultural sector	3.1
Changes in crop types	3.0
Reduction of grassland and pasture	1.8
Risk of invasive and/or disruptive species affecting agriculture	1.3
Changes in livestock farming patterns	2.5
Affect of reduced snow cover duration on farmland	6.1

TERRES DE L'EBRE

RISKS	VULNERABILITY
Increased demand for irrigation in agriculture	7.0
Fire risk in the agricultural sector	5.0
Changes in crop types	5.0
Impact on the productivity of dryland crops	8.0
Decrease in the quality of groundwater	6.0
Changes in the types of livestock farming	10
Reduction of grassland and pasture	3
Morphological changes to the coast and rising sea level	10
Risk of invasive and/or annoying species affecting agriculture	8.0

0 = low vulnerability 10 = high vulnerability

WHAT IS THE OVERALL VULNERABILITY OF THE SECTOR?

The agro-livestock sector, although the degree of vulnerability depends on the region, presents risks that could significantly affect its future production.

For the **MONTSENY**, climate change may exacerbate the abandonment of agricultural activities due to the loss of economic profitability of farms, which in turn will result in the progressive replacement of agricultural and livestock cover for forestry activities. Other risks to the Montseny include increased incidences of disease and pest outbreaks and a rise in feed costs for livestock due to the loss of summer pasture. However, livestock husbandry practices can be promoted that will contribute to the mitigation of the effects of climate change and favour adaptation, together with a more integrated vision of the agrosilvopastoral system and the cycle of production-distribution-consumption. Given that ruminants (cows, goats, and sheep) tolerate increases in temperature much better than pigs and birds, livestock activities could be adapted and modified in favour of ruminants, an approach that would also be more environmentally sustainable.

For the **l'ALT PENEDÈS**, the vulnerability of the agricultural sector is considered to be medium. Although vulnerability is high in terms of water quality and the decrease in the number of vineyards, the adaptive capacity of the sector is good, especially with regard to the results obtained in indicators such as changes in the productivity of vines. New agronomic and oenological techniques, the reintroduction of old varieties and the promotion of varieties adapted to warm climates are measures that can mitigate the negative effects of drought on the production and quality of wine.

The vulnerability of the livestock sector, however, is low, mainly due to the fact that there is so little livestock activity in the region especially when compared with agriculture. The sectors adaptive capacity, as well as the breeding of the black rooster, which is considered to be a quality livestock product, could also accelerate the recovery of farming practices linked to forest management.

The agro-livestock sector of the **TERRES DE L'EBRE** exhibits a high vulnerability. The effect of climate change on dry land crops, the reduction in water availability for irrigation and the implementation of new support irrigation systems are the principal reasons for the region's high vulnerability. The most vulnerable farmlands are those located in the Delta, a consequence of **rising sea levels** and land subsidence in the area as a whole, a situation exacerbated by a lack of sediment aggradation.

Dryland farming activities located in the Terra Alta (specifically vines and almonds) are highly vulnerable due to the diminished and irregular distribution of precipitation. However, the implementation of more efficient irrigation techniques or the introduction of plant species and varieties more adapted to a dry climate could reduce the overall risk.

With regard to the extended livestock sector, and despite changes in the rainfall regime the vulnerability is low, simply because it not a major economic activity within the region. However, by increasing livestock activities the region´s capacity to adapt to the risk of forest fires can be improved, although it should be noted that an increase in the incidence of mortality, abortions and stress in livestock due to increasing temperatures is already being observed. In order to mitigate this impact, substantial investment in more efficient techniques and systems for both refrigeration/cooling and water use will be required.