



UNIVERSIDAD
DE MÁLAGA



Food and Agriculture Organization
of the United Nations

Analyze the vulnerability and resilience of agricultural heritage systems to climate change through the specific case of GIAHS of the raisin grape from Axarquía (Spain)

1.- What are the characteristics of SIPAM de la Axarquía?

2.- Why determine vulnerability to climate change?

3.- How to determine vulnerability to Climate Change?

4.- What results have we obtained?

- Related to the cultivation of vineyards.

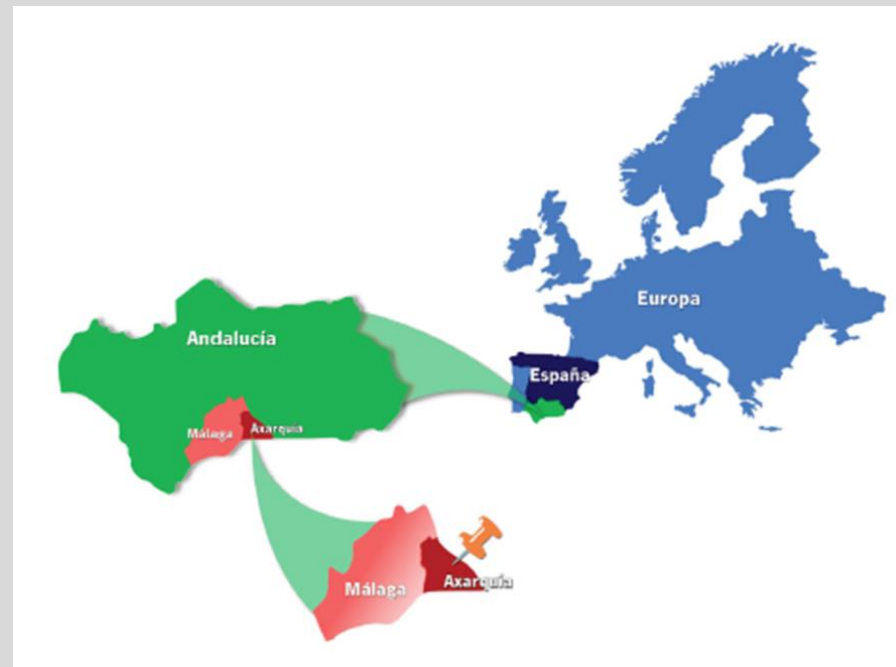
- Inherent to the entire SIPAM territory.

5.- What are the resilience mechanisms?

6.- What are the threats of GIAHS?

7.- Future scenarios

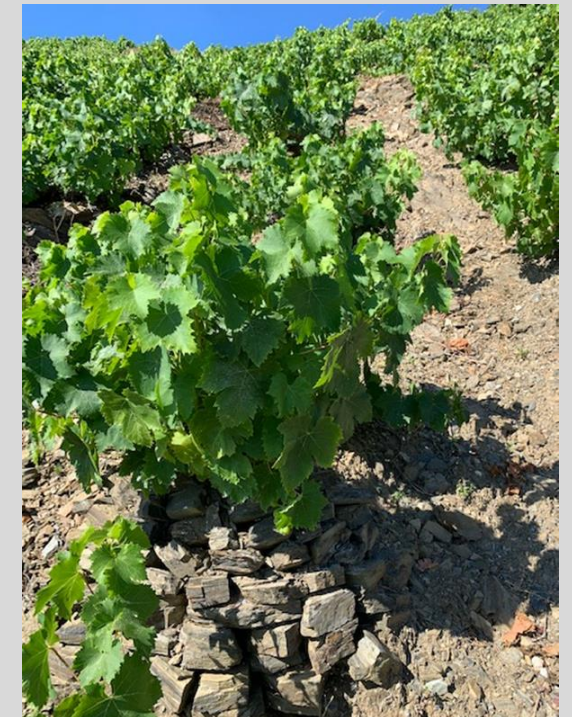
The Axarquía GIAHS is related to the vineyard dedicated to raisins, a land use that has starred in the landscape for more than 5 centuries.



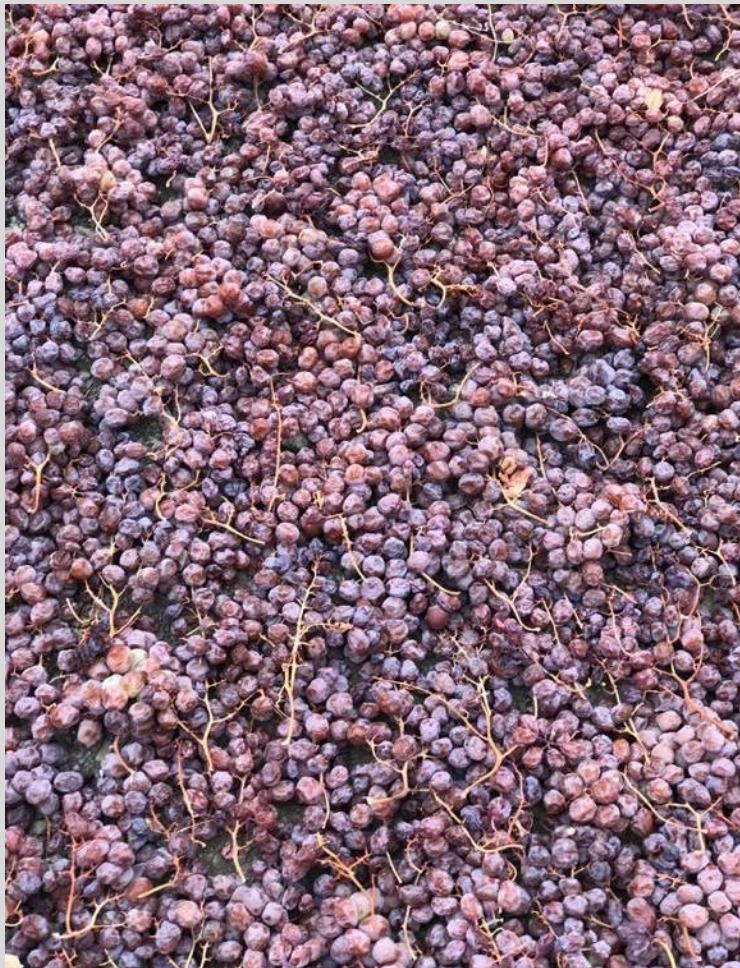
La Axarquía is a region that is located east of Malaga, in southern Spain, and at the western end of the Mediterranean.



Its highlights would be: Mediterranean mount, schists and phyllites, deficient soils, steep slopes, erosion, 450 mm / year, Mediterranean climate ...



The raisin has generated a whole way of life, giving the landscape features worthy of agrarian archeology itself.



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The vineyard is a traditional Mediterranean crop, which has been part of its landscape for centuries, therefore, very adapted to the Mediterranean climatic phenomenology of extreme events. Maximum resilience.



How does climate change affects?

Same circumstances as evidenced by IPCC for the Mediterranean.

More heat, more heat waves, more droughts, more dry spells, without a defined rainfall pattern, more torrentiality, rain threshold change.

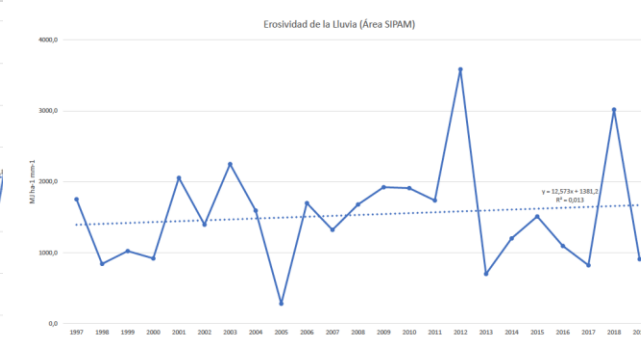
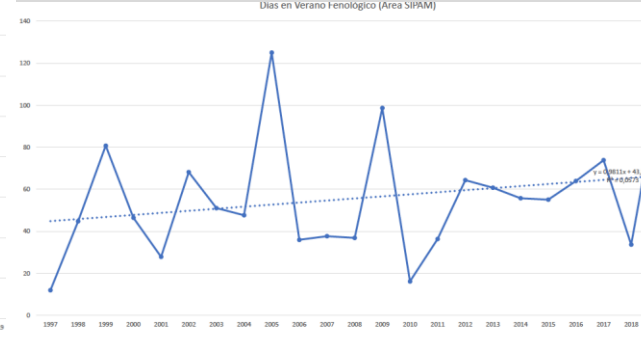
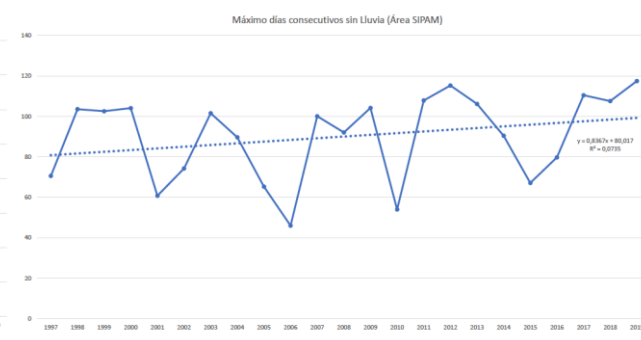
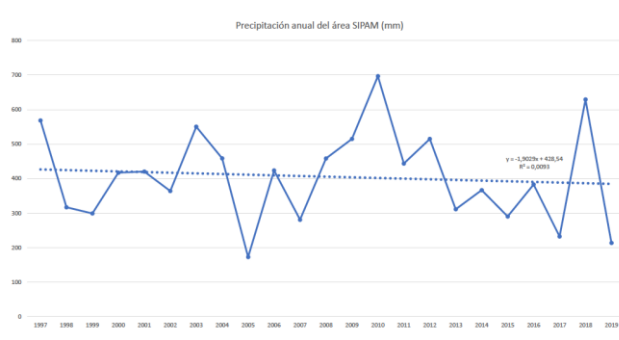


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The methodology is based on the determination of the exposure to the Climate Change indicators, the sensitivity of GIAHS to said exposure, the condition, and the adaptive capacity, to establish a synthetic index of vulnerability. That is, to establish the direct effect on the crop, and throughout the GIAHS territory, not only of environmental factors but also economic and sociodemographic.

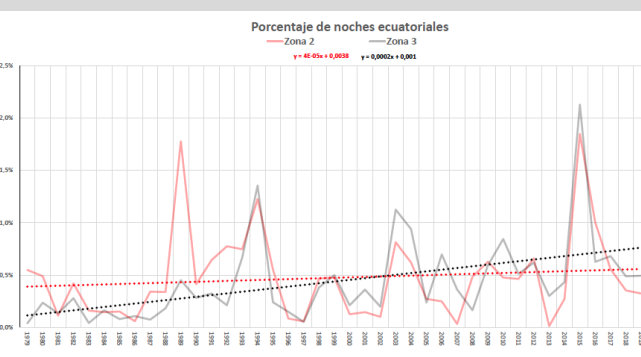
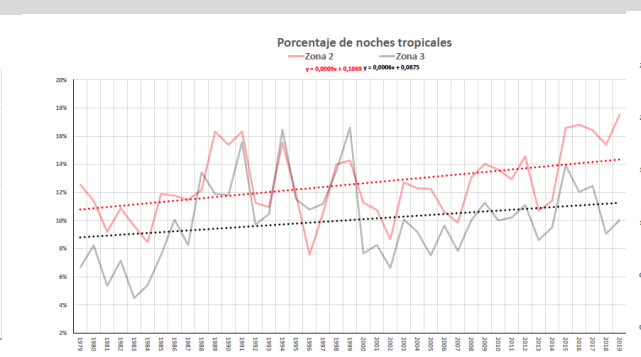
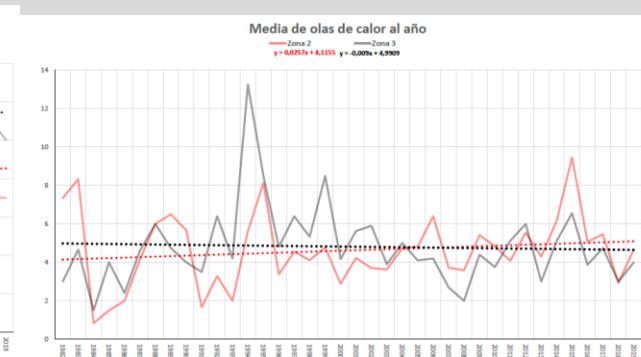
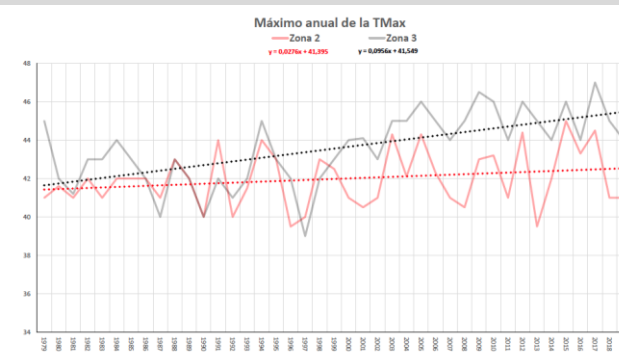


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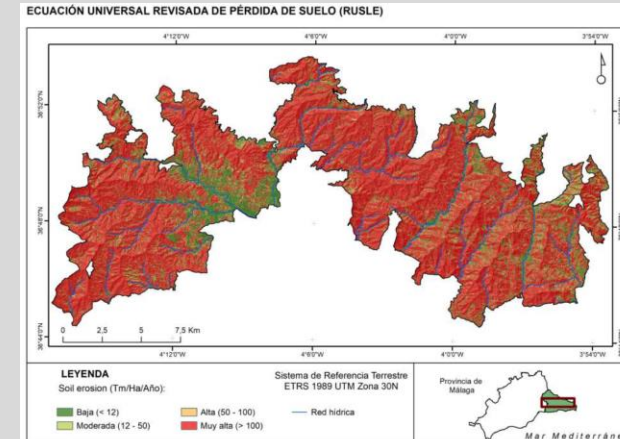
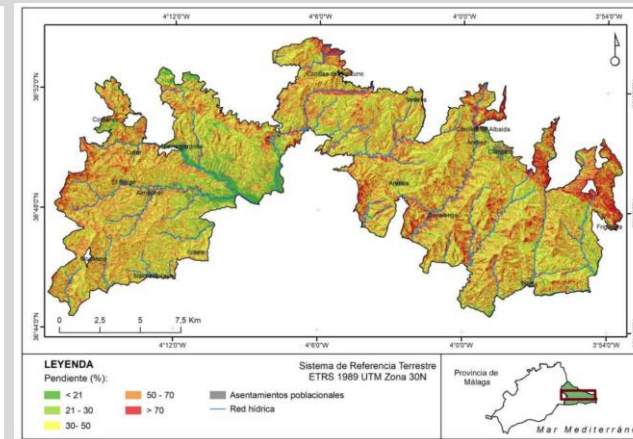
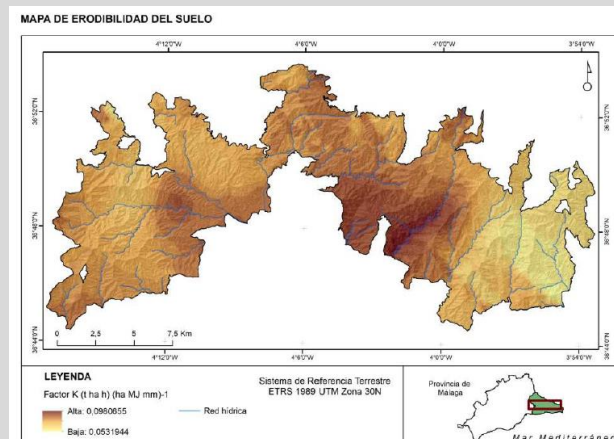
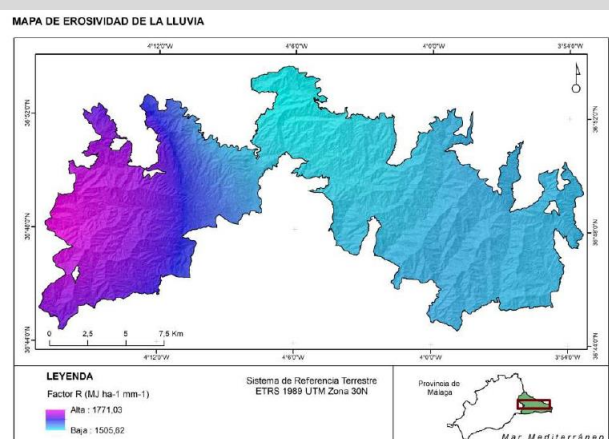
From the climatic point of view, both thermal and rainfall variables are very evident:

- 1.- Increase in the maximum annual temperature throughout the SIPAM.
- 2.- While in the eastern zone the duration in days of heat waves is maintained (4.5), in the western zone it rises.
- 3.- Generalized increase in the percentage of tropical and equatorial nights.
- 4.- Reduction in annual rainfall
- 5.- Increase in the maximum number of consecutive days without rain
- 6.- Increase of the duration in days of the phenological summer
- 7.- Increase in the erosivity of rain and displacement of aggressive rain towards autumn.



The results of the climatic dynamics described are territorial processes based on great erosion of rain, highly erodible soils as a consequence of the steep slopes and little compactness, and therefore extraordinary rates of soil erosion.

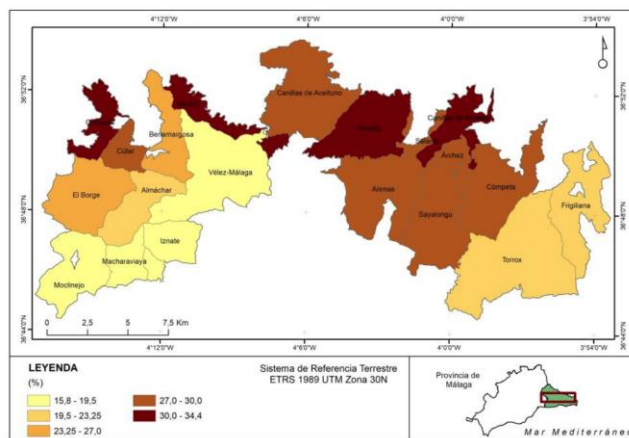
But the vineyard throughout its history has gone through similar critical situations and has been resilient to them.



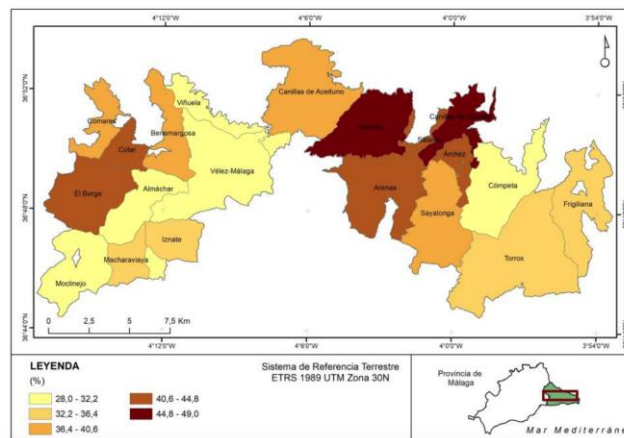
In this dynamic, there are other more worrisome conditions, such as:

- More than 25% of the population is over 65 years
- About 40% of households are single-person
- Only 41% of income comes from wages
- Around the 40% of the population lives on the poverty line (Income below 60% of the median)

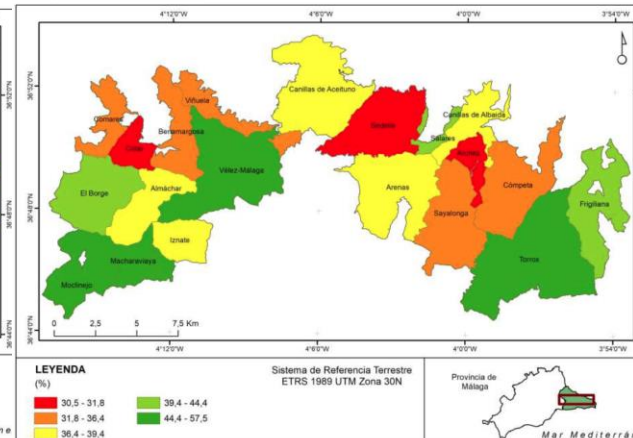
PORCENTAJE DE POBLACIÓN DE 65 Y MÁS AÑOS



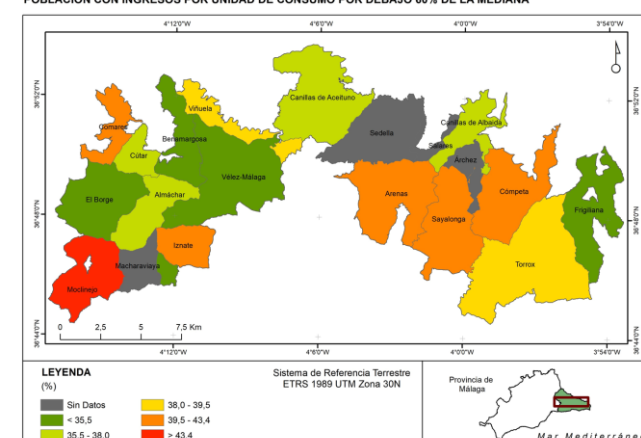
PORCENTAJE DE HOGARES UNIPERSONALES



FUENTE DE INGRESOS: SALARIO



POBLACIÓN CON INGRESOS POR UNIDAD DE CONSUMO POR DEBAJO 60% DE LA MEDIANA



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The viticulture-based way of life has generated various resilient strategies. One of them are the "agüaeras" or anthropic systems for the evacuation of runoff, and the prevention of soil erosion through gullies.

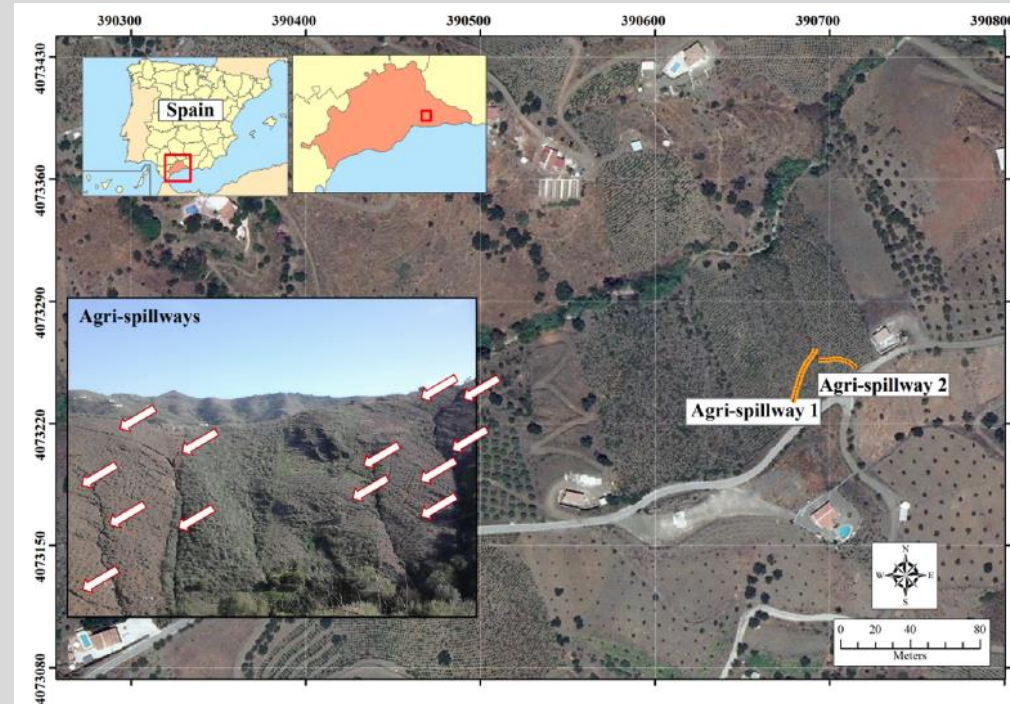


Figure 1 Localisation of the studied area and tested agri-spillways.



Landscape and activity that have given rise to a way of life of the population, which has been maintained over time with its landscape stamp. This is a key question.



The lowering walls of the slope ...

- Agricultural archaeological heritage
- Hydrological permeability
- Nutrient retention

More than 2 centuries



One century



Recent (30 years)





The surface stony "on top" through the roof effect protects the soil, since it allows infiltration and prevents the splash of rain.



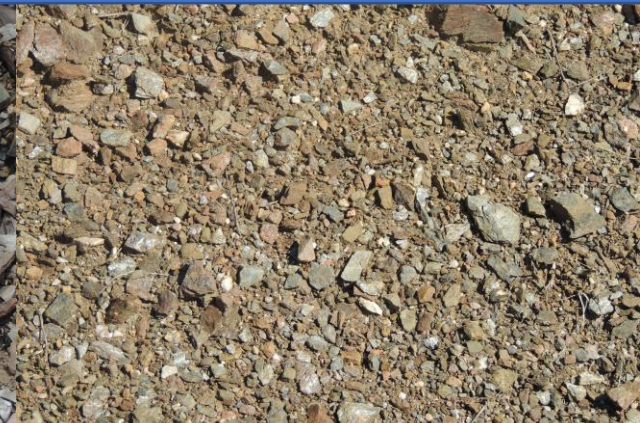
SOIL WEATHERING PROCESSES

Parent material

First step

Second step

Stoniness on top



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THREATS

- 1.- As an economic activity, it has become residual
- 2.- Competition with subtropics
- 3.- The main threat: demographic and socioeconomic.
- 4.- Water is the real limiting factor for development in the GIAHS territory based on the expansion of subtropical crops, which benefits the vineyard as a rainfed crop.



24.06.2020

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FUTURE

- 1.- Maintain the landscape, maintain the activity of the population in it.
- 2.- Involve the administration in it, giving value to the figure sipam
- 3.- Proactive role and monitoring of FAO



The great competitors of the vineyard are subtropical crops

