Climate Change at School (12-18 years).
Mediterranean and Dry Subtropical biomes in Northern Hemisphere

1. Abstract
The significance of human, social, economic and related problems linked to Climate Change, crushes into absence in pre-university educational curricula. The aim of our research is to offer a frame to deal with those problems in Secondary Education (k-12) by using strategies linked to “Education for a Sustainable Development” and Geographical Information Systems, not only to carry on Geographical Analysis and generate knowledge but also to facilitate skill learnings.

The scenario in which these learning is planned is dealing with ecosystems and societies in Mediterranean and Dry Subtropical biomes in Norther Hemisphere, as they are the ones suffering of hydrological stress, desertification risks, soil erosion, land uses…. and, in some cases, lack of resources to result in a great hazard related to agrarian crisis, migrations, socio-political instability and armed conflicts.

2. Links.
In order to explain the knowledge related to this topic such as the rise of sea level and its effects on human populations we have created the following maps:
- Rising of sea levels in different scenarios (map 1) https://arcg.is/1KGrre
- Population density in same different scenarios (map 2) https://arcg.is/e5vCX
- Both maps created together his Builder App https://acortar.link/USWU6o

3. Main targets:
1.- Allow students to understand key concepts and their implications in dry biomes such as drought, sea level rise, hazards, desertification, hydrological stress
2.- Use of GIS in order to to build knowledge based on the inter-relationships that shape our ecosystems.
3.- Improve learning by doing and reinforcing active citizenship linked to the strategies on “Education for Sustainable Development”

4. Methodology (three levels):
1.- Teacher sessions: The collaborative work and research of the group of teachers. We meet twice a month to develop this maps and to create story maps.
2.- Class sessions: Students in little teams guiding by the teacher. Teacher is never more a kind of repository of knowledge but a guiding person, to focus on each student learning outcomes.
3.- Evaluation: Both teachers and students fulfill a survey on these questions: What have students learned? What is the quality of what they have learnt? To what extent do these lessons improve the whole process? Is there any possibility of developing learning service?

5. Conclusions
● After four years, the aforementioned group of teachers (http://aprendeconmapas.ftp.catedu.es/experiencias.html) has realized that: GIS are an efficient tool to build knowledge.
● Teachers need to join to work together and to share knowledge
● Skill learning is better developed when taking into account collaborative strategies
● Students need not only to acquire knowledge but also to be active part in solving real problems and GIS are quite efficient in order to do this
● GIS are an effective tool to deal with “Education for Sustainable Developement”