

## THE ADAPTATION OF AGRICULTURE TO CLIMATE CHANGE AND THE ROLE OF LOCAL AUTHORITIES

Baix Llobregat Agrarian Park- 6 June 2018

### Agriculture adaptation measures to climate change

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Soil and climatic conditions are one of the biggest factors in the development of agriculture. In our case, Catalonia is also included in the Mediterranean ecosystem which is characterized by double stress, drought, high temperatures and high levels of radiation in summer and low or very low temperatures in winter, along with or consequence of important climatic phenomena like the Oscillation of the North Atlantic (OAN), Oscillation of the Western Mediterranean (WeMO) and the Arctic Oscillation (AO).

These environmental conditions generate a large number of favorable or unfavorable situations, depending on the place and circumstance, so among the latter, it is necessary to highlight the environmental stresses (biotic and / or abiotic), with the particularity that due to the large number of energy that human activity has put into the system measurable as CO<sub>2</sub>, the intensities and interactions between these stresses are increasing and more frequent.

Projections of climate models show reductions in the total amount of water available for this century and if we also take into account global change, which includes, among others, land uses, the increase in fixed and mobile population, the needs of the industry ..., that is to say our complex world-wide society, it is necessary to consider a predictable greater real competition for water, that will be necessary to be shared according to the needs (<http://www.irta.cat/ca/irta-laigua-solucions-mon-mes-sostenible/>; <http://medacc-life.eu/ca>; <http://www.fundaciocatalunya-lapedrera.com/ca/content/projecte accua>;

<http://demoware.eu/en>; <http://www.empresaclima.org/proyecto/vin-adapt/>;

<http://www.lifebroadmiclim.eu/es/>).

In the climate change scenario, which must be irrefutably associated with global change, which will continue at least throughout the present century, agriculture will play a very important role in maintaining the population and their state of health, in the development of wealth and in the maintenance of a stable sociocultural network in the landscape and in the supply of ecosystem products.

Climate change can increase the temperature in general, however where it is appreciable by society is at the local level, as these small changes in temperature can have a great influence on the balance of carbon source / sink, on plant growth (morphological and metabolic),

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on variations in the phenology of species and therefore in their relationships whether of predation, competition, symbiosis or pathogenicity (SeVi nº 3.450 / 4-7-2015).

Thus, certain areas of Catalonia are more exposed and potentially more vulnerable to climate change and consequently will suffer direct (lower productivity) or indirect (higher costs) effects on agricultural productivity.

This thermal increase, according to the third report of Climate Change in Catalonia in 2016, can reach significant increases of up to 4°C and rainfall not significantly lower, but with a tendency to reduce and be very irregular, all compared to the period prior to the 1980s.

[http://cads.gencat.cat/web/.content/Documents/Publicacions/tercer-informe-sobre-canvi-climatic-catalunya/TERCER\\_INFORME\\_CANVI\\_CLIMATIC\\_web.pdf](http://cads.gencat.cat/web/.content/Documents/Publicacions/tercer-informe-sobre-canvi-climatic-catalunya/TERCER_INFORME_CANVI_CLIMATIC_web.pdf)

Regarding climate change, we must add that there is great variability in everything, which generates tensions in society, in the system, which were not planned or were considered less intense, which are still and will be important and, consequently, they can generate serious dysfunctions in the models, but especially in the climatic projections, of population ..., such as:

- Unstoppable progress in globalization. - The improvement of conventional communications, but especially the development of information and communication technologies, lead to a global society, different from today. This generates reduction of trade borders, intensification of standardization processes and companies are adapting their strategies from a broader perspective of the competitive environment and in the location of many services.
- Interconnection of the energy vector with the power vector. (Reguant, F. & Savé, R. 2016. Food Availability and Sustainable Global Development. Chapter 2. The Food System: Globalization, Sustainability, Security and Food Culture. Thomson Reuters Proview Aranzadi. ISBN 978-84-9135-265-5 ). Because agriculture plays a relevant role in energy production, the integration of price trends is almost absolute. As a result, demand pressure on agricultural supply increases and volatile food markets become especially attractive for speculation..
- Fortunately, extraordinary development, currently unbalanced, of the so-called emerging countries, which generates demands in quantity and quality of food, which as a second derivative represents a greater pressure on natural resources.
- Biodiversity is undergoing important changes, which must be assessed with a new spatial, temporal perspective.

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([https://www.youtube.com/watch?time\\_continue=4&v=nIQWpsyoeoo](https://www.youtube.com/watch?time_continue=4&v=nIQWpsyoeoo)) and without prejudices and valuations from current knowledge. It is interesting and good to generate alerts, however it would be as if we look at a photo that is part of a film and not in its entirety. The changes, the transitions are important for good and bad, can directly affect the everyday life and in the final results, but it is necessary to assess whether it is better to preserve or understand the continuous change.

- Sustained and growing economic and social inequality is a reality, even it gets hidden or diminished, it is a great problem that sooner or later will generate an important global problem in the stability of the system.

The situation of growing demand for agricultural products promotes the need for greater intensification of production, with the aim of obtaining higher productivity per unit area and external input, along with a clear and determined policy of environmental conservation. All this poses a great challenge for agriculture in the 21st century, as the practices used so far have clear limits, both in their income (use of non-renewable resources) and results (saturation of production and pollution associated). A last and very important effort of Catalonia has been to adhere to the strategy of the 4x1000 of the COP 21 and 22 (<https://www.4p1000.org/es>; <https://avicultura.info/el-irta-se-adhiere-al-proyecto-internacional-4-por-1000/>) and together with other Catalan research institutions, to generate the first map of carbon content in the agricultural soils of Catalonia.

(<http://www.irta.cat/ca/les-reserves-de-carboni-organic-als-sols-agricoles-de-catalunya-ara-es-mostren-al-geoindex-de-icgc/>). This provides the baseline, to be able to plan at the territorial level the incorporation of organic matter in the soils and so, in addition to promoting an increase in carbon sequestration and therefore allow the development of the main mitigation strategy, helps to adapt to climate change, as an increase in carbon, organic matter in soils promotes water retention and consequently, develops an adaptive strategy in the face of drought, mostly in the dry rainfed crops, in the 70% of our agricultural area.

The problems associated with climate change are known and well detected, the solutions to adapt and / or mitigate it, based on science and techniques, are known and available, never in a general sense and always under the consideration of the strictest common sense. Now we need to act. Therefore, an important demonstration and transfer task is opened ... nothing is new, however, everything is more complex, fast, frequent ...

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