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## 110. Regional impacts of climate change and adaptation through crop systems spatial distribution: the VIGIE-MED project

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In many regions of the world, it is crucial to maintain provisioning from ecosystem services (ES) (crop, wood) and ES regulations (carbon sequestration), both strongly dependent on water availability and soil resources whilst those resources undergo strong pressures (climate change, demography inflation). Some of the key impacts of climate change on vegetation production systems occur at large scale (aquifer, watershed, forest), and the regional level (*i.e.* administrative district) is a key level for taking decisions for mitigation and adaptation. In the Vigie-Med Project, we develop indicators to characterise some of the provisioning ecosystem services linked to vegetation production (primary production, crop yield, wood production, vegetation cover, carbon sequestration, water production) and the associated risks (forest fire). In Vigie-MED, adaptation is seen through the land surface allocation between urban area and vegetation production systems, which must take into account the spatial distribution of soil and water resources and bioclimatic conditions. The understanding of land use change dynamics associated to adaptation strategies together with socioeconomic contexts (micro and macro) is an important issue of the project.

To compute relevant indicators and represent their dynamic in the future we have developed several components of a modelling framework. First, a representation of surface functioning of agricultural land has been implemented. It is based on crop models and represent at high resolution and at the regional level quantities such as the yield, biomass production, irrigation need and water flow. Similarly, a component has been developed for forest simulating vegetation growth, water consumption and mortality. Finally, a new model of land use change is under development. We have developed a small area (municipality) population projection model based on spatial regression techniques to account for interactions between municipalities and local factors having an impact on individual mobility. Transitions between cropping systems has also been investigated to assess the impact of biophysical constraints associated to climate change on agricultural systems. In this presentation we will describe the approach and the main results.

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