Adapting forest to climate change in drylands: the Portuguese case-study

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The recent expansion of the semiarid climate to all the region of the south of Portugal and the growing impact of climate change demands local adaptation. The growth of the native forest represents a strategy at the ecosystem level to adapt to climate change since it increases resilience and increases also de delivery of ecosystem services such as the increment of organic matter in the soil, carbon and nitrogen, biodiversity, water infiltration, etc. Moreover, decreases susceptibility to desertification. For that reason, large areas have been reforested in the south of Portugal with the native species holm oak and cork oak but with a low rate of effectiveness. Our goal in this work is to show how the cost-benefit relation of the actions intended to expand the forest of the Portuguese semiarid can be lowered by taking into account the microclimatic conditions and high spatial resolution management. The potential of forest regeneration was modelled at the local and regional level in the semiarid area using information concerning the Potential Solar Radiation. This model gives us the rate of native forest regeneration after a disturbance with high spatial resolution. Based on this model the territory was classified in: i) easy regeneration areas; ii) areas with the need of assisted reforestation, using methods that increase water and soil conservation; iii) areas of difficult reforestation because of the costs. Additionally, a summary of the success of reforestations was made in the historical semiarid since the 60s based on the evaluation of a series of case studies, where we quantified the ecosystem services currently delivered by the reforested ecosystems. We will discuss and propose a strategy for forests to adapt to climate change scenario in dryland Portugal.