Restoration of abandoned terrace landscapes through participatory land use for better adaptation to climate change

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Over the years, the use of terraces has proven to be the best method for cultivation in the dry and poor soils of Aegean islands, supporting the primary agricultural production and ecosystem services, as well as preserving biodiversity. Terraces improve rainfall absorbency, reduce soil erosion, smooth extreme summer temperatures, but also mitigate the risk of floods and forest fires. The project is focused on re-cultivation of abandoned rural terraces utilizing land stewardship practices for a large scale revitalization of island terrace farming, for smoothening climatic and environmental extremities. The functional restoration of the terraces as agricultural areas of high natural value aim to strengthen ecosystem functions, enhance the spatial continuation and functionality of precious local ecosystems and support a modern and climate smart agricultural sector for the Mediterranean islands, with profound benefits for the local societies, economies and biodiversity. The whole action takes place on the island of Andros, aiming to expand, if successful, to other Aegean and Mediterranean islands.

Selection of appropriate crops and varieties is essential to cultivation of abandoned terraces to mitigate climate change. Local landraces are well adapted to the indigenous climate conditions, promoting low-input agriculture and biodiversity. A selection of local landraces for cultivation, was explored according to their specific origin (local varieties with designation of origin and of historical use at local level), the linking of traditional crops to specific types of terraces, and local conditions (microclimate, soil composition, soil slope, geological and architectural peculiarities), so that the proposed crops could be used in cropping schemes for low-input and organic farming as climate-smart and friendly. The cultivation plan includes local varieties of grains, legumes and vegetables, which will help to adapt the landscape to the effects of climate change, by inhibiting desertification and protecting water resources. Among grains, barley local landraces are selected due to their drought tolerance in harsh marginal environments. Legumes are also known to have higher water use efficiency (WUE) compared to other crops, thus legume cultivation is central to drought-prone environments, such as Andros island. Moreover, legumes are widely known for their impact on soil fertility and structure due to the symbiotic nitrogen fixation ability. A set of cropping schemes are also explored to further evaluate the impact of abandoned terrace cultivation on ecosystem services and biodiversity enhancement.

During the first year of experimentation, three local landraces of barley, two local landraces of lathyrus species and one local landrace of kidney bean (a red variety of *Phaseolus vulgaris*) from Andros island were sown at the Institute of Plant Breeding & Genetic Resources of HAO-DEMETER in Thermi to provide adequate seeded material for use. The produced seeded material was used the following season for the cultivation of selected terrace fields in Andros island, while part of it was sown again in HAO-DEMETER's experimental fields, for further seed production and evaluation. Samples from the three barley landraces were examined both from a chemical and physical aspect. More precisely seed quality characteristics such as ash, protein content, grain humidity, thousand seed weight (TSW), hectolitre weight and sieve analysis (at 2.8mm / 2.5mm / 2.0mm) were evaluated. According to primary results, barley landrace II had the highest protein content (12.62%), in comparison to the other two, which had 11.38% (barley landrace I) and 11.45% (barley landrace II), respectively.

Samples of the barley landraces, which are cultivated this year in Andros island, will be also analysed to examine the impact of the environmental conditions to crop adaption and performance, including plant growth parameters, agronomic important traits such as grain yield, chemical and physical composition of the seed. In parallel, the impact of crop cultivation on soil structure and biodiversity is assessed. The collected data are analysed and discussed in correlation to climatic data acquired through a system of meteorological stations. The prospect of an integrated adaptation strategy to mitigate climate change in association to conservation of cultural heritage and ecosystem is discussed.

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