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Agroforestry systems: climate change adaptation and resilience

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Climate change is one of the greatest risks that farmers have to face in Europe and worldwide, as crops and livestock are negatively impacted by rapid and steadily global warming and also by the increased frequency of extreme climate events that harm quantity, quality and stability of food production. Current farming systems should be more resilient and adapted to changing and unpredictable weather conditions. Agroforestry is able to improve farm resilience due to the increased farm diversification, self-sufficiency and reduced production costs. They can also improve community resilience and enhance mitigation through e.g. carbon sequestration and reduced mineral fertilizer needs as recommends the National adaptation strategies (NAS) and plans (NAP). Adaptation is mainly related to droughts, extreme temperatures, flooding, sea level rise, storms and water scarcity. Main adaptation options recognised by the United Nations Framework Convention on Climate Change (UNFCCC) are related to water control (e.g. increase water retention, recycling and irrigation efficiency) and thermic regulation (e.g. shading and sheltering for livestock), that can be improved through AF systems.

Water retention is improved by the woody perennials as they increase porosity reducing therefore water run-off, but also due to the water soil extraction reduces the flooding risk, acting as barrier against unpredictable flooding.

Water recycling is fostered because some tree species such as the ash i sable to uptake water from deep soil layers and make it available in more superficial soil layers, permitting enough humidity to allow pasture to grow. Water efficiency can be improved if woody perennials are placed in such a way that wind desiccation negative impact on crops is reduced. The presence of trees in grasslands is key to provide shelter livestock. Some agroforestry actions help also to improve farm resilience such as the extension of the grazing season thanks to the reduction of the impact of droughts in herbaceous vegetation when growing under trees that allows animal to have a forage bank for this shortage periods, but also the leaves pruned by the trees used as forage in those specially difficult years when both drought or frost reduce forage availability. Moreover, the shade is able to avoid big losses of arable crops associated to extreme heats. Finally, understory grazing in forest stands reduces fuel and therefore fires risk, increasing the resilience in high risk periods associated to specific weather conditions.

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