



## Enhancing biodiversity in agroforestry systems

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Biodiversity is crucial to increase production per unit of land in agriculture by adequate combination of plants that are able to use different type of resources from soil and air therefore increasing provision of ecosystem services. Agroforestry improves biodiversity and therefore the provision of ecosystem services. The presence of isolated trees in an arable land clearly creates a spatial and temporary micro-environment with different water and nutrient balance that favours one varieties/species instead others that are different in the areas influenced by the woody perennials than in open sites. Accordingly, different understory varieties/species are differently adapted to different woody perennials influenced areas and the heterogeneity caused by these woody perennials affect plants but also different biodiversity taxon categories in cascade and the provision of ecosystem services from the land. For example when the presence of different species of trees or shrubs is considered at farm scale, woody perennials enlarges and complements the flowering period facilitating pollination, but also reducing water pollution that prevents from biodiversity losses in aquatic environments within, surrounding and even far away from the farm where birds and other animals need high quality waters to survive. Moreover, the use of woody perennials as feed is usually linked to autochthonous breeds that allow the local livestock breeds preservation. Europe hosts half of the autochthonous breeds of Europe, half of which are in risk of extinction. In permanent crops sites,

where fruit trees are part of the system and the herbaceous vegetation is used by livestock, the same before mentioned principles can be applied. Sheep grazing has been described as a good tool to reduce the needs of pesticides for some fruit trees such as chestnuts and therefore preserving the habitats for biodiversity maintenance and development at different scales. When silvopastoralism is used in permanent grasslands with woody perennials, permanent crops and forestry, the presence of animals enhance biodiversity through the creation of microsites caused by the trampling, faeces deposition but also by the different intake selection that animals do among the different species. All these aspects increase the number of places with different conditions that are occupied by different species and therefore increasing biodiversity. The use of grazing animals in forestlands where fire risk is high is one of the cheapest solutions to reduce the fire risk and therefore the subsequent biodiversity losses.



Figure 1. The agroforestry landscape is biodiverse

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