TARGET REGIONS FOR SILVOARABLE AGROFORESTRY IN EUROPE

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Abstract

Silvoarable Agroforestry (SAF) has recently been proposed as an alternative land-use system for Europe. In a geographic information system (GIS) data on soil, climate, topography, and land cover were integrated to identify agroforestry target regions where (i) productive growth of trees (*Juglans* spp., *Prunus avium*, *Populus* spp., *Pinus pinea*, and *Quercus ilex*) in SAF systems could be expected and where (ii) SAF systems could potentially reduce the risk of soil erosion, contribute to groundwater protection and increase landscape diversity.

The analysis shows that the investigated tree species could grow productively in SAF systems on 56% of the arable land throughout Europe (potential productive tree growth area). 80% of the European arable land were classified as potential risk areas for soil erosion, nitrate leaching and/or landscape diversity. Overlaying potential productive tree growth areas with the arable land, which were considered as environmental risk areas yielded target regions. They were found to make up about 40% of the European arable land and thus SAF could contribute to soil protection on

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4%, to mitigate nitrate leaching on 18% and to increase landscape diversity on 32% of European arable land.

Although limited by constrained data availability, the study shows that SAF could be implemented in a productive way throughout Europe and that it could contribute to resolve some of the major land-use problems. The environmental benefits could justify the support of SAF by subsidies.

*Keywords*: Agroforestry; Geographic Information Systems (GIS); Sustainable land use; Environmental impact; European scale; Assessment; Potential tree growth