Environmental impact assessment of three strategic energy crops for Italy

Alessandro Suardi

Consiglio per la ricerca e la sperimentazione in agricoltura - Unità di Ricerca per l'Ingegneria Agraria (CRA ING), Monterotondo (Roma), Italy

Since the 2006 sugar CMO reform, the EU sugar beet sector has undergone a drastic restructuring process. In Italy, the sugar production capacity -as well as the sugarbeet cultivated area- has been reduced by 50%. Consequently, sugar companies have presented plans to convert the sugarbeet industry into different agro-energetic chains. An environmental sustainability evaluation of this conversion was critical. In this study an environmental impact analysis of three energy crops (*Brassica napus* L., *Arundo donax* L. and *Poplar* ssp.) has been carried out. These plant species are considered strategic in Italy for the implementation of energy supply chains for biofuels. Six farming units extracted from a sample of 251 rapeseed farm units (2751 hectares), 7 giant reed farm units (7,8 hectares), and 91 poplar farm units (440 hectares) were analyzed using a statistical multivariate analysis. Using the Life Cycle Assessment (LCA), the cultivation methods for each of the six farm units were evaluated to identify the one with the lowest impact, and the crop comparison was carried out in order to identify the crop most environmentally sustainable for the Italian territory.