Environmental Effects of Afforestation in North-Western Europe
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Environmental Effects of Afforestation in North-Western Europe

From Field Observations to Decision Support

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Although the Common Agricultural Policy (CAP) of the European Union is still largely driven by socio-economic factors, environmental concerns are increasingly integrated into it. With the reforms of 1992, 2000 and 2003, measures have indeed been introduced or fine-tuned aiming at enhancing the environmental sustainability of the agricultural sector in a farm perspective as well as in a regional one. This is illustrated by the fact that, by 2003, farmers must maintain their cultivated and set aside land in good agricultural and environmental condition in order to be eligible for income support under the CAP’s so-called 1st pillar, dealing with the agricultural market organisation. Under the 2nd pillar, focusing rural development, the agri-environmental schemes are considered to be the most useful tools for making agriculture more environment-friendly. These schemes allow farmers to be compensated for income losses due to the adherence to practices with an added-value for the environment.

Afforestation of agricultural land can be considered under the 1st pillar as an alternative for set-aside of agricultural land in order to cope with economically unsustainable surplus-production. However, afforestation is also supported by the 2nd pillar as one of the measures contributing to rural development, avoidance of land abandonment and preservation of the environment.

Forestry is known to generate less job opportunities and to contribute less to the gross domestic product than agriculture when practiced under equal site conditions. However, in a situation of subsidized agricultural surplus-production, wood or biomass production may be economically interesting alternatives at the macro-economical level. In addition, the extensification of land use through afforestation may create opportunities for new types of economic activities in the sphere of recreation and tourism. New forests may also have other, less tangible benefits for society. Examples are the buffering of noise-generating or visually unattractive human activities and the creation of conditions in which biodiversity can be preserved or enhanced. Afforestation of today is therefore supposed to serve multiple purposes, whereas afforestation of the past primarily aimed at increased wood production.

It is generally assumed that afforestation can play a substantial role in meeting the greenhouse gas emission reduction targets under the Kyoto-protocol by increased carbon (C) sequestration in biomass and soil. Other expected environmental effects of afforestation as compared to the agricultural situation are a decreased hydrological recharge to water bodies and a decrease of nitrate losses to these bodies. However, there is limited scientific understanding about the influence on the hydrological, C and nitrogen (N) cycles as a function of the physical conditions of the sites designated for afforestation, of the former agricultural management of these sites and of the conducted afforestation management. As a result, predictions of the environmental effects of afforestation remain largely uncertain and are of limited use for afforestation planners and managers.
Against this background, the AFFOREST project was conducted within the EU 5th Framework Programme for Research & Technological Development (Energy, Environment and Sustainable Development theme). The project ran for four years from May 2000 onwards. Six partners from four countries participated in the AFFOREST project. These were Belgium (Division Forest, Nature and Landscape of the Katholieke Universiteit Leuven), the Netherlands (Alterra Green World Research, Institute of Environmental Sciences Energy Research and Process Innovation (TNO-MEP), and Institute of Environmental Biology, Department of Biology at University of Utrecht), Sweden (Department of Forest Soils at the Swedish University of Agricultural Sciences) and Denmark (Department of Applied Ecology at Forest & Landscape Denmark) who co-ordinated the project.

The major objective of the project was to strengthen the knowledge regarding environmental effects of afforestation of agricultural land in north-western Europe with focus on the water, C and N cycles and their interrelationships. Furthermore, the ambition was to disseminate the improved knowledge by means of guidelines and a computerised system capable of providing support for decisions regarding ‘where, how and how long to afforest?’ in order to reach one or more environmental targets. This system should be able to assist managers to optimise the location of new forests according to specified environmental criteria.

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