

## Nature Conservation in Europe: Approaches and Lessons

### Annex DK.1. Cost-benefit Analysis of the Skjern Å Restoration Project

Anette Petersen and Jan Woolhead

A cost-benefit analysis (CBA) of the Skjern Å restoration river was carried out at the Department of Economics, Forestry and Landscape, Agricultural University in 2001 (Dubgaard *et al.*, 2005). Its purpose was to illustrate how non-market goods in the form of environmental services could be valued and compared with the costs of producing and preserving such goods; in this case in the form of a major nature restoration project.

The analysis was carried out in accordance with the welfare economic criteria set by the Danish Environmental Research Institute<sup>1</sup> and others that were recommended at the time. Importantly, the EU grant of DKK 32 million (€4.3 million) that was provided was considered an income for Danish society (i.e. not as a transfer), and was therefore included in the analysis as a benefit. The guide from the Danish Environmental Research Institute recommended a societal discount rate of 3%, while the Ministry of Finance at this time recommended a discount rate of 6-7%. In the analysis, it was decided to use discount rates in the range 3–7%.

The extensive construction work and the loss of land rent due to the inclusion of agricultural land accounted for the majority of the project's costs. On the benefit side, the largest component was the improvement in outdoor recreation opportunities, followed by the reduction in pollution (i.e. retention of nitrogen, phosphorous and ocher), improved angling and the existence value of increased biodiversity. Together, these benefits make up almost 85% of the total benefits.

The results of the CBA were found to be sensitive to the choice of discount rate. At 3%, the project appears to be very beneficial for Danish society with a present value of net benefits at almost DKK 238 million (€32 million). But even with a 7% discount rate, as then recommended by the Ministry of Finance, the project has a present value of DKK 5.5 million (€0.74 million). At 5%, the present value of net benefits is almost DKK 75 million (€10 million). Today, the Ministry of Finance's recommended discount rate has been reduced to 4%, so the project is doing quite well according to this current criterion. It is also worth noting that the benefit estimates applied were generally drawn from the lower end of the value intervals found. This further strengthens the conclusion that the resources allocated to the Skjern River project were put to good use from a social point of view.

Furthermore, the Skjern River restoration project was estimated to reduce greenhouse gas emissions by approximately 15 thousand tons CO<sub>2</sub> on an annual basis (see section 3.3.6. in Dubgaard *et al.*, 2005, p. 138). This effect was not included in the CBA. The reason for this was that reduced greenhouse gas emissions due to land use change could not be included in Denmark's reduction obligations under the Kyoto protocol (pers. com A. Dubgaard). At present, Danish climate policy permits the inclusion of greenhouse gas reductions due to land use change, such as in the Skjern River restoration project. Consequently, a CBA of the project conducted today would result in considerably higher net benefits due to the inclusion of the economic value of reduced greenhouse gas emissions.

### References

- Dubgaard, A., Kallesøe, M.F., Ladenburg, J. & Petersen, M.L. (2005) Cost-benefit analysis of river restoration in Denmark. In *Cost-Benefit Analysis and Water Resources Management*, eds R. Brouwer & D. Pearce, pp. 124–150. Cheltenham, UK: Edward Elgar Publishing.
- See also, Danish Ministry of the Environment - Danish Forest and Nature Agency (2005) *The Skjern River*. Leaflet in English of the Skjern Å project. [https://naturstyrelsen.dk/media/nst/67311/119E\\_Skjern.pdf](https://naturstyrelsen.dk/media/nst/67311/119E_Skjern.pdf)

<sup>1</sup> The Danish Environmental Research Institute was a Danish research institution which is now placed under the National Center for Environment and Energy (DCE).

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