

## Groundwater protection in Copenhagen

### Location

**Country:** Denmark

**Scale:** local

**Region:** Copenhagen

### Compensated /improved ecosystem services

Protection of groundwater quality and quantity

### Management

The main environmental problem related to groundwater resources in Denmark is the threat of groundwater pollution stemming from pesticides and fertilizers used in agriculture. In the last years, this has led to a situation where two well fields used for water supply had to decrease their levels of groundwater abstraction. One of them is the Solhøj well field where the normal abstraction of about 5 million m<sup>3</sup> per year had to be reduced to only 3 million m<sup>3</sup>.

Forest-groundwater PES scheme has been developed to combat the further pollution of important groundwater bodies. It aims to have two main effects:

- land-use change from agriculture to forests through afforestation of mainly broadleaf species, and
- in existing forest areas, restrictions on the use of fertilizers or pesticides, and in some cases also underplanting of conifer stands with broadleaf tree species, as the latter increase groundwater recharge.

Copenhagen Energy Corporation delivers drinking water to around one million consumers in and around the municipality of Copenhagen. During the last twenty years Copenhagen Energy has lost about 14 million m<sup>3</sup> of groundwater per year. One of the largest groundwater bodies used by Copenhagen Energy is the Vigersted well field from which also ca. 5 million m<sup>3</sup> per year are abstracted. This is equal to the consumption of 100.000 Copenhageners per year. It has therefore been very important for Copenhagen Energy to protect this groundwater body through afforestation measures and the designation of wellhead protection zones where no pesticides are used.

Just next to the Vigersted well field used by Copenhagen Energy a privately owned forest is located. In order to secure the quality of the groundwater resources found in this area, an agreement has been made between Copenhagen Energy and the owner of the forest. Through this voluntary agreement the private forest owner is now obliged to set aside 95 hectares of his forest where in the future no pesticides may be used. In addition, Copenhagen Energy was able to buy 530 hectares of farm land on which broadleaf trees were planted. Afforestation activities were implemented and managed by the state and local municipalities.

The time frame of these agreements is 30 years, since groundwater abstraction licenses usually run for the same period of time. As the licenses can be extended, the financial agreements can also be extended. In general, a periodical review of the contracts is carried out every 5 years.

### Stakeholders

#### Sellers or service providers:

- Private forest owner who eliminates pesticides in his forest;
- Private farmers who sell their land so that it can be afforested.

#### Buyers and beneficiaries of services:

- Private persons, namely the customers of Copenhagen Energy, who consume the supplied water, and are the ones who contribute to Copenhagen Energy's fund.

**Intermediaries:**

Copenhagen Energy plays only the role as an intermediary in this scheme that collects the money from the clients, and afterwards invests the funds as an incentive for private land owners to change their forest management behaviours or sell their agricultural land.

**Timeline**

**Establishment year:** N/A

**Time horizon:** long term

**Status of PES:** active scheme

**Availability of economic data**

A fund has been set up by the water company itself in order to finance the provision of ecosystem services. The average consumer pays about 75 kroner (ca. € 10) per year to the fund. For setting aside 95 hectares of private forest, Copenhagen Energy has calculated to pay 10 million kroner (ca. € 1.5 million) in total. The forest owner pays on a yearly basis for reducing the use of pesticides. In case of non-compliance with his contract obligations, the forest owner is fined.

**References / Source of information**

C. Van Ham, G. Jansse, and M. Gaworska. 2009. Final report study on the Economic value of groundwater and biodiversity in European forests. 90 p.

[http://ec.europa.eu/environment/forests/pdf/grounwater\\_report.pdf](http://ec.europa.eu/environment/forests/pdf/grounwater_report.pdf)