

Agri-environment Schemes applied in Denmark¹

Agri-environmental measures in Denmark are based on a number of independent projects that can receive full or part support from the state and the EU. Seven relevant support measures were identified that fall within “PES-like” schemes, including the scheme “conversion to and management of wetlands”.

- Support to pilot projects and demonstration use of technology that reduces environmental impacts, improve working environment and reduce negative impacts on nature;
- Support to the creation of wetlands covers up to 100% of expenditure eligible for public funding and maximum 15,000dkr per ha with possibility of dispensation. All landowners can apply regardless of their status. Eligibility conditions include that the area must be within Environmentally Sensitive Areas (ESAs) and will contribute i.a. to a reduction of phosphor leakage and enhance fauna and flora. During 2009, three rounds of applications are open.
- Maintenance of grass and nature areas covers a per hectare support for grazing (1400dkr/ha) and grazing and/or hay cutting (800dkr/ha) in areas classified as ESAs. Agreements have a duration of five years;
- Support to reduce the use of nitrogen and stop use of pesticides, targeting all farmers in Denmark, including ecological farmers, regardless of location and type of farm. The application for this support was open during 3 months in 2009;
- Support to set-aside of riparian zones at open streams and lakes larger than 100m² targets all farmers and intends to function as an incentive for farmers to locate their obligatory set-aside area along lakes and streams. The objective is to reduce the leakage of nitrogen, phosphor and pesticides to the water environment;
- Support to ecological farming covers three sub-categories of support directly to farmers. These are i) per hectare support; ii) support for the conversion to ecological farming; and iii) support to reduce the use of nitrogen, and stop the use of pesticides.

¹ Nordic Council of Ministers (2009). Payment for and Management of Ecosystem Services: Issues and Options in the Nordic Context, by Marianne Zandersen, Kirsten Grønvik Bråten and Henrik Lindhjem, a report on PES commissioned by the Working Group on Environment and Economics under the Nordic Council of Ministers (<http://www.norden.org/fi/julkaisut/julkaisut/2009-571>).

- Support to plantations improving the countryside and biotopes (e.g. windbreaks), where the public support covers 40–60% of total costs. Projects can be applied by individual land owners or by a group of minimum seven land stewards. Objectives are to preserve and enhance biodiversity by creating good conditions for animals and plants; preserve and enhance environmental, nature and cultural as well as landscape values and recreative values; establish landscape corridors and increase the share of small biotopes and create natural limits around technical plants. Permanence should be assured a minimum of five years after the final payment. The second round of applications originally planned during 2009 has been postponed to 2010.

Payment for the Establishment and Maintenance of Wetlands in Denmark

As part of the national Water Environment Plan III (Vandmiljøplan III/VMP III), Denmark has set the goal of reducing the leakage of nitrogen by more than 400 tonnes per year by the end of 2009. The programme to establish and maintain wetlands has been in place since 2005 and has by mid 2009 achieved an estimated reduction of nitrogen of 282 tonnes, converting a total of ca. 2,525 ha of agricultural land to wetlands². Also the use of pesticides and phosphorous emissions should be reduced, albeit a quantitative goal has not been set. The over-arching objective is to improve water quality and natural flora and fauna.

The establishment of wetland areas under the agri-environment schemes under Pillar II plays an important role in this plan as it contributes to enhancing the ES: water purification and waste treatment. Wetland areas also contribute to increasing biodiversity by providing rich habitats for birds, insects, amphibians, spawning areas for fish and the basis for a high diversity of plants.

The payment for establishing and maintaining wetland area in Denmark is an example of PES as a conditional performance contract, placed in the tool box of direct market-based voluntary instruments. It is a voluntary measure that is government-financed, i.e. the government acts as buyer of the ES. The measure is constructed such that sellers of ES are paid for activities that are intended to lead to the provision of ES, i.e. sellers are paid a proxy of the provision of the ES.

The ES that is indirectly targeted through this measure is primarily water purification and water treatment capacity of wetlands. Additional ES being provided through the activity include natural hazard regulation and water regulation. These are however not specifically targeted by the buyer of the ES.

The expected intermediate products and final products of the ES being provided depend on who the beneficiaries are. For anglers, intermediate services are improved water body quality and final service is the fish population. For the local and regional population valuing the protection from nature's whims, intermediate products are specific regulating and supporting mechanisms in wetlands that provide the ES regulation against natural hazards. For the national population valuing a high level of biodiversity, the intermediate product comprises specific regulating and supporting functions of wetlands providing

² Of the 282 tonnes of nitrogen reduction per year and 2525 ha of wetland from 2005-2009, 821ha and 80 tonnes of nitrogen are applications from 2009 which have not been finally approved in August 2009.

habitats and clean water for a diverse flora and fauna. When assessing the value to human society of the PES scheme, it is useful to distinguish which ES is the main target and who are the beneficiaries, at a local, regional and national scale.

Beneficiaries of the conversion to wetland scheme pay only indirectly for the provision of the ES through general taxation to the Government. As such, the Government pays for the provision of the ES on behalf of the whole population in Denmark, regardless of where the actual conversion to wetland takes place. From this perspective, beneficiaries can be said to be the national population. In reality, the local and regional population benefits through improved angling opportunities, recreation and flood control protecting housing and installations.

In terms of distribution of rights, sellers of the ES have clearly substantial rights on their land. Owners of the land in this case have the right to extract and produce products on the land prior to the implementation of the scheme (Right of withdrawal); the right to regulate internal use patterns and transform the resource (Management right); the right to determine who will have access or withdrawal right and how those rights may be transferred (Exclusion right) and finally the owners also have the right to transfer the rights of management and exclusion to other parties (Right of alienation). The buyer (here the Government) of the ES has no or little legal right to demand that the land stewards ensure a significant reduction in nitrogen and phosphorous leakage neither does the buyer have the right to demand that the land stewards do not damage waterways and biodiversity and hence that they should pay for any damage to the environment caused by the production systems in place.

The proxy for the ES, e.g. conversion from farmland to wetland, is fairly well-defined. The new wetland established must be able to reduce a specific quantity of nitrogen per hectare per year, reduce phosphorous leakage and provide positive effects on flora and fauna. The latter two aspects are not quantified further. Conditionality is relatively well established as the applicant land owner needs to provide the buyer with effectively occurred costs of implementation, and these need to be approved by a state authorised public accountant and a proof that the wetland is noted in the land registry.

The government periodically opens calls for applications and any land owner regardless of their institutional status can be eligible. Seller selection is based on a number of criteria. The main parameter is the potential capacity of the proposed wetland to reduce nitrogen leakage by a minimum of 100kg per hectare per year³. Sites that are larger rather than smaller are also prioritised. If applications exceed the amount of funding available in a year, the Government prioritises those plots of land located within zones defined in the Planning Act as being potentially applicable to wetlands. Emphasis is also put on accept and motivation of land owners to participate if local authorities are the applicants. Applicants also need to argue for a reduction in the leakage of phosphorous and improvement of natural flora and

³ The estimation of the capacity of the land to absorb nitrogen is based on a model by DMU where input data such as local soil conditions, precipitation, catchment area, and crops are used to calculate the level of nitrogen that can be expected reduced.

fauna. Since 2005, a total of 1704 ha⁴ have been granted support for the establishment of wetlands. Local authorities have increasingly made use of the support for wetland establishment, thus increasing the average size of projects from 15 ha in 2005 to 20 -33 ha in 2007–2008. To date, there have not been an excess of applications compared to the yearly budget of ca. DKR45 million. Some rejections have been made on the basis of the above-mentioned criteria.

In order to ensure that the goal of reducing nitrogen leakage has a lasting effect, the agri-environment scheme has a built in permanence assurance by requiring a declaration on the land that the wetland area may not be removed, once established. When providers of ES apply for the payment, a requirement is made that they also make a registration on their land that the established wetland may not be removed and that they apply for an additional fund for the compensation of lost income over 20 years. Hereafter, the payment stops, but the wetland may not be destroyed.

Payment for conversion of the wetland is a fixed one-off payment covering up to 100% of the establishment costs and the compensation for maintaining and/or managing the wetland area is based on the previous type of land use on the site. The more intensively managed the land, the higher the compensation. Table 1 lists the different levels of payment according to the prior land use. The payment, however, is not spatially explicit. It is not linked to the capacity of the wetland to provide the demanded ES on the particular plot, nor is it made dependent upon the total size of the wetland or the presence of other converted wetlands in the vicinity, e.g. providing an agglomeration bonus if the neighbouring land manager joins the PES scheme.

The fixed-rate payment, despite the efforts to allocate the payment according to opportunity costs, does not take into account individual cost structures of farmers. Competitive tendering or auctioning may prove a more efficient way of allocating reserved funds for wetland establishment such that more wetland is converted for each Kroner spent. An associated risk with fixed rate payments is that the fixed level of compensation during the 20 years is either set too high or too low causing social inefficiency. As the scheme is relatively untargeted and undifferentiated in spatial and economic terms, there is a risk of weak additionality in terms of paying for conversion to wetland that would have been adopted anyway.

Experience from the 5 years of funding mechanism indicates that the compensation for keeping and managing the wetlands primarily attracts marginal land with low opportunity costs. Owners of land with a high nitrogen reduction potential and high opportunity costs are not applying for the fixed payment compensation. The evidence of the scheme not having attracted more applications than yearly budgets available, also indicates that the offer from the Government is not sufficiently attractive to landowners, leaving room for increasing efficiency.

The wetland conversion scheme is fairly well targeted towards an environmental objective, without including a wide range of side-effects such as job creation, competitiveness and rural regeneration under the Rural Development Plan. This generally ensures a relatively high degree of meeting the

⁴ By mid 2009, 29 applicants covering 821 ha have applied funding. The evaluation was not finalised by the time of this report.

environmental objectives of the scheme. However, the main focus of nitrogen leakage reduction has led to unwanted effects, where the conversion to wetland in areas in or close to protected areas have had negative effects on flora and fauna.

Table 1. Overview of a Wetland Conversion PES scheme

Name of PES scheme	Establishment of Wetlands
<i>Ecosystem service aspects</i>	
Type of ecosystem (e.g. forest, wetland, agro-ecosystem)	Wetlands
ES or benefits to be delivered	Reduction of nitrogen of min. 100 kg/ha; Reduce phosphorous leakage; positive effect on wild flora and fauna;
Type of services (provision, regulation, cultural, supporting)	Regulating (water regulation, water purification and waste treatment, natural hazard regulation)
Kind of value (direct use, non-use, indirect use)	Indirect use (water regulation & water purification) & direct use (natural hazard regulation)
Type of good (club, open access, pure public)	Pure public
<i>Institutional set up</i>	
Beneficiaries	Local and regional users such as recreational anglers, recreation, housing, tourists, and households within catchment area
Suppliers	Private landowners, public companies & institutions, foundations, associations, organisations and community co-operations
Distribution of rights	Suppliers have the rights of withdrawal, management, exclusion (on private land) and alienation (in the case of communities owning the land)
<i>characteristic</i>	
Land use or practice paid for (linked to ES or benefit)	Payment for the conversion of land to wetland in order to reduce nitrogen and phosphorous leakage and improve flora and fauna biodiversity. I. Compensation of up to 100% is paid to cover the implementation costs: - Feasibility studies - Archaeological studies - Investigations that become necessary but which were not foreseeable at the time of the application - Indirect costs related to the use of own machinery - Salaries to personnel active in the project - Salary to the project manager - Clearing of vegetation - Registration - Project reporting - Review and evaluation II. Compensation is paid for the maintenance and management of the project area
Kind of payment	I. One-off payment to cover <i>implementation</i> costs of maximum 15,000dkr /ha. IIa. yearly compensation for <i>keeping</i> the area as a wetland during a 20-year period to maintain and manage the area range from 3500dkr/ha for arable land that has not been laid out as pasture during the last 5 years to 300dkr/ha for nature areas (excl. forests). IIb. Yearly payment for the <i>management</i> of the wetland range from 3350dkr/ha for grazing of particularly valuable and difficult to access grass- and natural areas to 200dkr/ha for a yearly clearing of vegetation. All Payments are taxable.
Who are the buyers? (ES users, government, other?)	Government and EU Commission
Who administers the programme?	Danish Ministry of Food, Agriculture and Fisheries
How are sellers of ES selected?	Potential level of nitrogen leakage reduction must be more than 100kg/ha per year. Larger areas are prioritised. Very small areas are excluded. In case of several landowners in one application, all must show written motivation and accept of project. If applications exceed the available funding, the Ministry prioritises according to areas located in zones that in the Planning Act are specified as potentially suitable for wetlands (this has not been the case in reality)

Other requirements	The project must be carried out based on natural hydrology and it may not lead to a net leakage of ochre. Sellers may only be compensated for the conversion to wetlands if they also apply for funds to maintain and manage the wetland over 20 years.
Scale of programme (local, regional, national, global)	National. In reality most funded areas are found in Jutland are included in the programme due to the weather patterns (excess precipitation causing excess nitrogen leakage).
Monitoring	Payment for implementation costs are based on costs reviewed by a state authorised public accountant and the changes to the land needs to be registered in advance. NERI has received funding to undertake an environmental evaluation of the programme. This has not been carried out to date.
Sanctions	No sanctions are known.

Lessons

The Danish example of an agri-environment scheme showed that the conversion of farmland to wetland since 2005 was not sufficient to meet the environmental target to reduce nitrogen leakage. The target was missed by a third with 282 tonnes of nitrogen reduced per year compared to an objective of 400 by the end of 2009. Several contributing factors can be identified:

- Reform of the local authorities at the beginning of the scheme in 2005 led to a delayed interest from the part of local authorities. Towards the end of the scheme, where municipalities were more consolidated to take an interest in the programme, larger sites have been proposed by municipalities in cooperation with several landowners.
- Lack of economic incentives to agglomerate areas spatially has resulted in generally small and isolated projects, where municipalities have not acted as initiator. This has especially been the case in the beginning of the programme;
- Fixed-rate payments for the maintenance of wetlands may have contributed to the relatively low uptake of the scheme and the compensation levels have most probably excluded the highest performing plots of land;
- Output-based assessment of the applications (i.e. capacity of the specific plots of land to reduce nitrogen leakage) has been successful in targeting areas meeting a minimum level of nitrogen reduction, ensuring a minimum degree of environmental efficiency;
- There is scope for streamlining application processes and evaluating the applications with regard to biodiversity impacts. Competitive tendering has not been considered as an option to date.