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GREEN INVESTMENT FUNDS: PIM PROJECT
Netherlands Case Study on Biodiversity Incentive Measures

by T. van Bellegem, A. Beijerman and A. Eijs

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FOREWORD

This paper is one of a series of 22 case studies that describe practical experiences in OECD Member countries with the use of incentive measures for the conservation of biodiversity and the sustainable use of its components. These case studies were submitted by OECD Member countries to the OECD Working Group on Economic Aspects of Biodiversity as a contribution to the OECD study of the design and implementation of appropriate incentive measures for biodiversity conservation and sustainable use. In order to ensure maximum comparability between the case studies, all were developed under the common methodology described in "Incentive Measures to Promote the Conservation and the Sustainable Use of Biodiversity: Framework for Case Studies" [OECD/GD(97)125].

The practical experiences described in the 22 case studies were used as the basis for the policy advice developed in the Handbook of Incentive Measures for Biodiversity: Design and Implementation (OECD, 1999). This Handbook combines the lessons learned through the various experiences described in the case studies covering a wide range of ecosystems, economic pressures on biodiversity, and utilising various incentive measures with sound economic theory to develop a practical, step-by-step guide for policy-makers on the design and implementation of successful incentive measures for the conservation and sustainable use of biodiversity.

This paper was provided by the Dutch Government and was written by T. van Bellegem, A. Beijerman, and A. Eijs. It is released as an unclassified document under the responsibility of the Secretary-General of the OECD with the aim of bringing information on this subject to the attention of a wider audience.

This study, and the other 21 case studies submitted by Member countries, are available on the world wide web at http://www.oecd.org/env.

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EXECUTIVE SUMMARY

This case study examines the Project Infiltration Maaswater (PIM) in the Netherlands to limit desiccation caused by the lowering of the water table through excessive groundwater abstraction. The PIM project is an initiative of a drinking-water supply company to change from using groundwater to purified and filtered surface water. However, groundwater abstraction is more economically viable than this treatment at current prices. In order to alleviate the environmental pressures caused by groundwater use, the Dutch government is using a number of measures to help to close the profitability gap between these two alternatives in order to make the treatment of surface water a more viable option. First, the PIM project is being financially supported – partly through EU funds and partly by the Dutch government through their classification of it as a green project so that investments in green funds which support it can be exempt from tax. Second, most provinces have introduced groundwater extraction levies, and the central government has also been taxing water extraction since 1995. Third, permits are now required for groundwater abstraction and only a limited number are available in most provinces. Finally, groundwater abstractions will be completely abolished or reduced in three locations.

Ecosystem studied: inland freshwater ecosystems

Incentive measures used: positive tax incentives, market creation, information provision, capacity building

Main lessons learned: The scheme has been very effective in supporting the PIM project; it is equitable in that it applies to all green funds, and is limited to those with only moderate profits; it requires only a fairly simple administrative system; it is popular with banks, project owners and the public; however, the scheme is not sufficient on its own, but should be a part of an integrated approach to the biodiversity pressures which utilises a mix of incentive measures.

1. GENERAL DESCRIPTION

1.1 Description of Dutch ecosystems

The Dutch landscape is characterised by a wide variation in soil type, the quantity and quality of water and the amount of nutrients. Differences in relief are limited but nevertheless they do have an impact on the hydrology. The Netherlands is a large delta area where the soil material consists mainly of sediments. The age-old impact of wind, ice and water have resulted in a diversity of landscapes which, in combination with the influence of the North Sea and rivers has produce a wide diversity of environmental situations. These variations in the environment within short distances provide a host of suitable small-scale habitats for many different species and ecosystems (IKC-NBLF, 1994) Being one of Europe's most densely populated countries, the human influence on Dutch ecosystems is immense. Concomitantly, changes in sorts and types of ecosystems occur. Traditionally, most of the land has been used for agricultural purposes. In the course of the second half of the present century, the increase in scale and intensity of human impact on the landscape led to a substantial loss in biodiversity (AKB, 1996; IKC-NBLF, 1994).

Major ecosystem types in the Netherlands (LNV, 1995) are: River areas, higher sandy soil areas, marine clay, peat soil areas, reclaimed peat areas, dunes and coastal sand areas, hilly land, closed sea channels, tidal areas, the North sea.

The case study will concentrate on two types of human activities that harm biodiversity in the Netherlands: an alternative system for groundwater abstraction to lessen desiccation and the introduction of organic farming. The later case is described in a separate paper.

1.2 Description of main impacts

The first project described in the case study deals with a project to limit desiccation caused by groundwater abstraction. In the Netherlands desiccation is one of the most important sources of loss of biodiversity. Desiccation is caused among others by the abstraction of groundwater for the production of drinking water and industrial water and drainage of surface water. As 40% of Dutch native plants' roots need to be in direct contact with the groundwater (Bink et al. 1994) it is clear that lowering the groundwater level has disastrous consequences for biodiversity. The project called PIM (Project Infiltration Maaswater) aims to reduce the desiccation caused by groundwater abstraction in the East Brabant region by introducing a technology to produce drinking water from surface water. Apart from reducing risks of desiccation, the project yields high biodiversity values in newly created wetland areas.

1.3 Identification of incentive measure: Green investment funds scheme

The Green investment funds scheme is a government scheme combining a fiscal measure with investment in sustainable projects. Private individuals can put their savings or investments into a so-called 'green fund'. Interest and dividend derived from this green fund are exempt from income tax. The money in the green funds has to be invested in green projects. So investors in green projects can contract loans at lower interest rates. Green funds are managed by banks and enable banks to give reduced-interest loans for green projects, e.g. an organic farm. The rate is usually about 2% less than commercial interest rates.

1.4 Identification of economic sectors targeted by incentive measure

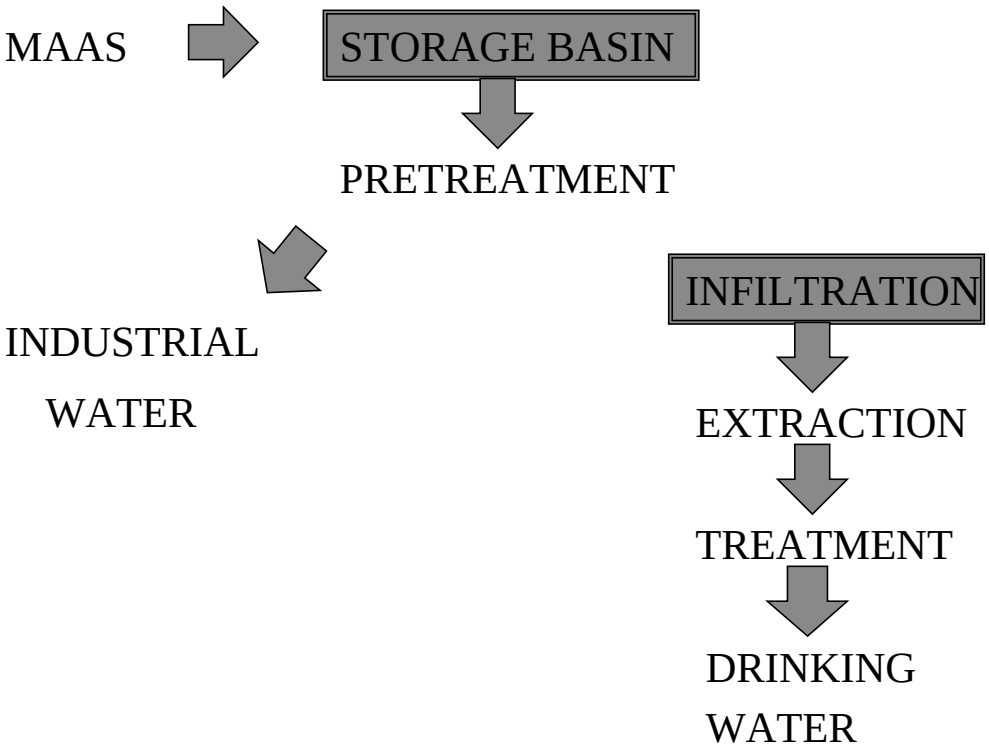
The Green investment funds scheme targets the following economic sectors: agriculture, energy supply, processing industry (agricultural non-food products), nature conservation and housing etc. As the “green investment funds scheme” is not limited to a specific group of projects, it is important to many sectors, depending on the type of project.

In the case discussed in this paper, the scheme particularly targets water companies, industry and agriculture. Moreover, the Green investment funds scheme targets the banking sector and private individuals.

1.5 Introduction of the Project Infiltration Maaswater (PIM)

The PIM-project is an example of an initiative of a drinking-water company to change from groundwater to surface water as a raw material. The project takes in water from the Maas and the Rijn to a basin. During a residence time in this basin the water is partly cleaned by the microbiological activities in the basin. After a residence of a couple of weeks in the basin the water is subjected to physical and chemical treatment processes (e.g. activated carbon treatment). By then water is already fairly clean and can be transported to the infiltration zone where the water gradually penetrates the soil. The soil is only used to remove remaining bacteria and viruses. The water remains in the soil for an average period of eight months. After this the (artificially made) groundwater is pumped up and again led though various filters. The water is now ready for human consumption. No chlorine treatment is applied.

PROCESS FLOW DIAGRAM OF PIM WATER TREATMENT SYSTEM



The main impact of PIM will be to contribute to nature development and to reduce desiccation, creating the buffer basin and new wetland areas.

The economic sectors first affected by PIM are the water companies as they requested that PIM be admitted to the green investment funds scheme as a green project. In the province of East Brabant drinking water was always produced from groundwater. Now the East Brabant Water Company (WOB) is partly switching to using surface water because of insufficient groundwater supply for future drinking water needs. This will affect consumers. Furthermore other industries are targeted because partly filtered surface water (B water) will be supplied to them by the water companies. This is an environmentally sound alternative to their using precious groundwater for industrial needs. Some farmers will also be affected by PIM, as their agricultural land will be bought (or compensatory land will be offered to them) by WOB Due for necessary land conversion.

WOB's initiative (NLG 427 million) will be financed by the WOB itself, by the EU (394 .988 47 ECU) and by Dutch taxpayers/Government by means of the Green investment funds scheme.

2. IDENTIFICATION OF CAUSES AND SOURCES OF PRESSURES

2.1 Identification of sector activities and resulting pressures

2.1.1 Desiccation: a Dutch environmental problem with relevance for biodiversity

In the Netherlands desiccation is a major cause of loss of biodiversity. Land becomes more arid through lower groundwater levels caused by:

- improved draining of agricultural fields;
- abstraction of groundwater to prepare drinking and industrial water;
- an increasing evaporation by higher yielding crops. The high crop production results from the use of more fertilisers, pesticides and irrigation;
- the increase of urban area, especial the area with paved surfaces, causing a decrease in infiltration of rain water into the soil, resulting in the draining of the rainwater into sewer systems and surface water.

The loss of biodiversity is the result of:

- the lower availability of water through falling the groundwater levels (locally the level may fall more than one meter but the mean lowering of the level is 35 centimetre);
- this results in increasing aeration of the soil causing the increase of aerobic microbiological activity and a better degradation of organic materials so more nutrients become available;
- a lower percolation of calcium rich water, leading to a lower buffering capacity for acid depositions;
- changing composition of groundwater and surface water because the lower groundwater level is compensated by the inlet of surface water derived from surrounding areas.

The major cause of desiccation in the Netherlands is the draining of the agricultural fields. However the abstraction of groundwater plays an important part in desiccation. The increase of the abstraction of the groundwater from about 500 million m^3 in 1950 to 1 000 million m^3 in 1988 caused a decline from 17 to 25% in groundwater dependent ecosystems in the Netherlands (Beugelink, Claessen and Mülschlegel). Groundwater abstraction's share in desiccation problems in the Netherlands is estimated to amount to 30%. (RIVM, 1995). Up to now about 65% of the drinking water is prepared from groundwater.

In the Netherlands the total surface of nature reserve areas harmed by desiccation is 3 000 km^2. An additional area of 3250 km^2, which is important for biodiversity, is being damaged by desiccation.

The restoration of arid areas by raising the groundwater level will not always automatically result in a recovery of biodiversity. For example in peat areas the situation has been changed irreversible because the structure of the top layer of the soil has changed. When land use changes from agriculture to nature reserves acidification of the soil can occur. This may result in a bioavailability of high concentrations of heavy metals and of DOC (dissolved organic matter). Knowledge of the above-mentioned effects is patchy. Nevertheless has Parliament decided to reduce arid areas of countryside by 40% by 2010. Switching from groundwater abstraction to the use of surface water (combined with an infiltration process, if desired) is one of the ways of achieving political goals.

2.1.2 Description of the ecosystem in the PIM region

The catchment areas of the Maas and the Waal are part of what is called the rivers area of the Netherlands. The present meandering nature of these streams arose at the end of the last ice age through a constant input of water and sediment. Broad river plains arose with many overlapping and adjacent systems of flows. In these catchments areas processes of inundation, groundwater and rainwater stagnation and erosion and sedimentation have long had free play and have exercised their influence on the appearance of the region. These processes have contributed to the creation of landscapes comprising river woodland, and river dunes with pioneer vegetation. Natural channels and stagnant water (closed off tributaries, stagnant pools) and the gradient between high and low dynamic sites made for a richly varied natural vegetation.

Man has dramatically changed this natural river landscape. Little is left of the original river plains and the accompanying flora and fauna in the Netherlands. The dynamics of the river itself has been curbed virtually everywhere. Buildings along the river, curtailment by hard banks and dikes (notably for shipping and accelerated flow of water) and an increase in the area of paved land surface has made the rivers increasingly more vulnerable. These are the reasons for the disappearance of the original ecosystem. Channels have lost their function and tributaries are dry. The river plain has gradually been taken over by man for homes and agriculture.

It was farming practices in the past that often had a positive impact on biodiversity because they created new gradients and maintained existing ones. But in the last decades the use of the river plain (both inside and outside the dikes) has become increasingly more intensive. Intensive farming has had significant consequences everywhere in the Netherlands as a result of more rational and intensive use of the soil (see also the text on organic farming). Through more evenly spread and relatively heavy fertilisation low nutrient plant communities disappear and the groundwater level was artificially kept at a stable and low level through pumping for drainage purposes and to enhance accessibility to heavy machinery. What's more large quantities of groundwater are extracted for irrigation. In the case of the rivers area we are talking in particular about the multi-functional, grasslands inside the dikes. The original gradients, which made this landscape so biologically diverse in the past, have gone. Poor grassland with a high biodiversity value has virtually disappeared as a result of excessive fertilisation and desiccation. In some places minor remains of what were formerly such rich ecosystems are encountered. The majority of these places are now nature areas (Loofbosjes Lieshout, Molenheide, Broekbossen close to Rullen, the Breugelse Beemden and Heitje van Overstegen). These nature areas are now primarily threatened by atmospheric depositions of nitrogen and polluted substances and by desiccation as a result of groundwater extraction.

2.2 Identification of underlying causes of biodiversity loss

It is impossible to describe all the underlying causes of biodiversity loss in this report. Only the most important ones will be mentioned below.

2.2.1 Missing markets or non-existing property rights

The value of biodiversity: missing markets and non-existent property rights

One of the major causes of the biodiversity loss is its low economic value. The benefits that people derive from biodiversity can be seen as an indication of the socio-economic value of biodiversity. Determining the value of biodiversity causes problems because biodiversity is a semi-public good; not everyone is able to enjoy it equally, but everyone still has to pay for it (Slangen and Thijssen, 1994). The loss of biodiversity in the Netherlands can be largely attributed to the fact that biodiversity had little value, either as a private or public good. The Dutch economic system does not include property rights on biodiversity. Non-domestic bio-diversity is considered a public good. To realise the value of biodiversity as a public and a private good, a consensus is needed that the conservation and sustainable use of ecosystems is warranted for different reasons. These reasons are among others that biodiversity constitutes a national heritage, is a reservoir of genetic and species diversity and can have recreational value. Government policy regulations will have to become aware of the value of biological diversity as a public good in combination with its private value.

Groundwater: its quality, its constant availability, its low treatment costs

Desiccation is caused by the drainage of agricultural land (60%) and the extraction of groundwater (30%)[1]. The constant quality of groundwater, the better quality of groundwater as opposed to surface water and availability are logical reasons for extracting groundwater. Besides in the past groundwater was cheaper to treat than surface water.

Groundwater: free good

For centuries groundwater was a free good. Groundwater has long been considered an unlimited supply of clean water. Everybody was free to use as much groundwater as was needed. Water companies pump up groundwater to supply water for consumer and other purposes. Industry pumps up own groundwater for cleaning purposes, for production purpose, for cooling water or for rinsing purposes. Farmers also extract and use groundwater to irrigate crops and for other purposes like cleaning equipment. Even consumers sometimes have their own small groundwater pump. The disappearance of ecosystems that rely on higher groundwater levels is the result.

Recently most provinces introduced a small groundwater-extraction levy. Since 1995 central government has also been taxing the extraction of groundwater (17 cents per m^3 for industry and 34 cent for consumers). *These initiatives put a price on a formerly free good. It is expected the levy will rise in the near future.*

[1] Environmental balance sheet, RIVM; 1995

Groundwater: Missing markets

Property rights for the use of groundwater used to be non-existent. In the past short-term benefits in exploiting groundwater resources were generally favoured. These days it is necessary (at least for the larger extraction's) to have a permit. Thus a market has been created. The permit has the same effect as a property right to an amount of groundwater. Provinces may determine how many permits will be issued to control total extraction. This responsibility was transferred from central government to the provinces in the nineteen eighties. As water demand is still rising, water companies are starting to buy up permits to extract groundwater from others, or switch to surface water.

2.2.2 Information failure: Lack of information about biodiversity

One of the problems to be addressed in the field of biodiversity is the lack of information and the lack of knowledge. The lack of information and knowledge about biodiversity helps to ensure that biodiversity is not appropriately valued. Lack of information exists at two levels: the lack of scientific knowledge and the lack of public awareness about biodiversity.

Lack of scientific knowledge.

A lack of knowledge has been observed in the Netherlands with regard to the functional importance of biodiversity indicators, stress on stress reactions, the dynamics of diffusion and relationships between species (Sprengers et al., 1995). A lack of insight into the dynamics, resilience or vulnerability of species or whole ecosystems, makes it difficult to value the efforts required to keep biodiversity at a high level. There is however enough knowledge about biodiversity to pursue a sensible policy even now. The social acceptability of these policies is being hampered because uncertainties and lack of knowledge are seized upon as being a legitimate excuse for not taking the necessary steps (Sprengers et al., 1995).

Since knowledge on useful species for future use is also lacking, it is difficult to value biodiversity in terms of its gene pool function. Lack of knowledge is not only limited to biological facts: the economic and social value of biodiversity is limited. This lack of scientific knowledge generally is a drawback in the field of protecting biodiversity.

Lack of public awareness and public information

Political decisions on biodiversity are very important. These decisions are not only based on the knowledge of detailed scientific facts but on public awareness. So protecting biodiversity is not only a matter of collecting scientific reports. The dissemination of information and knowledge is as important as the generation of this knowledge. The importance of dissemination of knowledge is often neglected in the field of biodiversity.

Education of the general public, as done by nature conservation organisations, about protected, threatened or keystone species, contributes to the awareness of the value of biodiversity. It is however apparent that the Dutch education system fails to teach people about thinking in cycles and whole ecosystems, thus making it difficult for people to evaluate the effect of their actions. Currently, nature and environmental education are being introduced in primary schools so that now more attention is being paid to this subject.

2.2.3 Institutional failure causing biodiversity loss.

Water drainage authorities

The low groundwater levels cause a loss of biodiversity. The organisations responsible for the water levels of surface water are important in this context. Water has traditionally been very important in the Dutch society. The old struggle against the threat of the water gave rise to strong local organisations to protect man, land and property from water. Protection against water is not the responsibility of the provincial or local authorities but of specific water drainage organisations. These organisations see protection against water and the removal of water as their first priority. Moreover, the boards of these water drainage organisations are not elected democratically, by the one-man, one vote system. Landowners have more votes than the other inhabitants of the area. As farmers own most of the land, their interests are taken well into account in the decisions of the water authorities. Biodiversity is not generally one of farmers' prime concerns. Fortunately, in recent years, this unbalanced situation has been changed through a growing participation of nature conservationists on these boards.

Size of Dutch Water Companies

In the Netherlands drinking water is produced by twenty-six water companies, most of them small or medium-sized business. The technology of groundwater abstraction can be used on a small scale with low investment costs. Alternative (environmentally-friendly) processes are only profitable on a large scale. These large scale projects involve high investment costs. Only large companies are in a position to implement expensive alternative projects. The water companies have to co-operate or even merge. There is a development in this direction.

2.2.4 Enforcement failure

Polluter pays principle

As already mentioned, in practice the value of biodiversity is considered to be low. We also indicated that often there are non-existent property rights or in some situations biodiversity is considered to be a public good and consequently a public responsibility. In society it is normal for a person who damages property to be held liable for that damage. This principle does not apply to damaging biodiversity, the reason being that the value of biodiversity is considered to be low and that non-existent property rights obstruct the way to the civil court for citizens. Considering biodiversity a public good, the government should defend biodiversity in the civil court. In practice this almost never happens in the Netherlands.

Not only does the civil law system fail to protect biodiversity, the same applies in the administrative system of law. In theory, environmental laws in the Netherlands generally apply the polluter pays principle. This principle is also codified in the EU system of law. Clearly, there is a difference between the theory and the practice. With regard to the protection level needed to protect biodiversity, the polluter pays principle is only implemented and enforced on limited scale. It is generally not applied in the case of emissions of low concentrations of minerals into groundwater, emissions of low concentrations of polluting substances, air pollution with low concentrations of acids, behaviour that has effect on the groundwater level etc etc. All of this can result in harm to biodiversity without a real and viable opportunity of legally stopping the breakdown of biodiversity.

The lack of application of the polluter pays principle allows some economic sectors to go on producing far beyond the real price of their products. For example the environmental damage of the agricultural sector is estimated in the Netherlands to amount NLG 4-7 billion. (Kalverkamp 1990.) (See Chapter 4 of the paper on Organic Agriculture)

Detection problems

The enforcing of biodiversity conservation is hampered by the fact that biodiversity cannot be easily measured, making enforcement of incentives aiming at the conservation of biodiversity difficult.

Lack of enforcement

As biodiversity has hardly any value for groundwater companies, spontaneous protection of biodiversity is not always likely. In the Netherlands there is a reasonably well-working enforcement system for environmental pollution but this enforcement is not targeted at the many types of pollution that are important for preventing loss of biodiversity. Currently there is only a low level of enforcement on the conservation of biodiversity.

2.3 Identification of adverse incentives

There are no direct adverse incentives in the field of groundwater abstraction. However there are a lot of indirect adverse incentives that affect the groundwater level. An important disincentive is the infrastructure provision in the Netherlands.

2.3.1 Infrastructure provision

The Netherlands is a country were a lot of land lies below sea level. The land is kept dry by an intensive infrastructural water control system comprising dikes, canals etc. The main reason for desiccation is that agricultural and suburban areas are kept dry. The government has financed the necessary infrastructure to keep the agricultural land dry in order to safeguard a self-sufficient food supply. From the fifties onward, groundwater levels were artificially lowered (by 35 centimetres) after the winter so that machinery could work the land early in the season. In the close vicinity of permanent groundwater abstraction sites, the groundwater level can drop more than half a meter in some areas. In terms of desiccation, the infrastructure measures provided by central government can be seen as a policy failure.

The government's financing of infrastructure measures, which are the prime cause of desiccation are now being used as an argument by the water companies, nature conservationists and farmers. They say that the government should now be held responsible for financing the measures needed to stop desiccation. The government should pay damages to farmers in areas where the groundwater level is being restored to its natural height. Now that we realise the damage desiccation has done and is still doing to nature and biodiversity, the government must again spend money to reduce the effect. This of course is easily said with hindsight. Seen from the desire to have a strong and healthy agricultural sector, these infrastructure measures were absolutely necessary.

3. IMPACTS ON ECOSYSTEMS

The PIM project aims at arriving at other forms of drinking water extraction by infiltrating surface water instead of the classic extraction of groundwater. New forms of water extraction are coupled with active nature development, which involves the recovery of specific biotopes of the river landscape and the creation of wetland rich in species (MER).

3.1 Biodiversity in locations where desiccation is being limited

Indirectly this will also contribute to the general combatting of desiccation of nature in the Netherlands. WOB licenses allow for an extension to groundwater extraction; no use is being made of this. In three locations groundwater extraction will be completely abolished or reduced (total 8 billion m^3). Since groundwater extraction does not need to be stepped up or is even being reduced this will entail 15 nature areas being saved from further desiccation in the area around Lieshout. Industrial needs for groundwater in the region may also diminish because water supply tailored to requirements can be supplied using the new method of water extraction. No more will be said here about the effects of terminating the desiccation in the 15 nature areas around Lieshout. Clearly these effects are extremely important.

3.2 Biodiversity surrounding storage basins

For the intake of water a large storage basin will be created in the flood plain of the Maas; between the eastern edge of the basin and the Maasdijk (dike), typical elements of the rivers area will be incorporated. Thus there will be closed off tributaries, stagnant pools and sandy higher lying parts. At high water this area will accommodate some of the discharge of water from the Maas. The lay-out of this part of the flood plain is consequently in line with the nature development plans for a larger area in the vicinity (Fort St Andries). With the return of landscape elements such as closed off tributaries and pools, opportunities will be created for certain types of nature, which are the target of Dutch conservation policy. There will be isolated closed off tributaries where land formation processes will occur. These processes will occasionally be reversed through regular inundation and higher rates of flow. There will be fluctuating water quality, ranging from river water quality after flooding to dilution with rain or percolating water. In terms of flora the area offers habitats for diverse plant communities including classes of algae (Charatea), Pond weed (Potametea) and Shore weed (Littorelletea). Isolated closed off tributaries will form a peaceful foraging ground and breeding ground for the fauna from the river area such as amphibians and birds.

Areas that are not inundated or where accelerated discharges are limited will produce areas of reeds and rushes. Flora here include Bidentetea tripartiti, Phragmitetea and the class of wet grasslands Milinio - Arrhenatheretea. Reed vegetation offers a biotope for other organisms including the Sedge

warbler, Blue throat, Water shrew and possibly (with the improvement of other conditions and its reintroduction) the Otter.

3.3 Biodiversity around infiltration basins

Surface water from storage basins is channelled by means of a treatment station where pre-treatment takes place to meet the legal standards for infiltration to an infiltration basin where it seeps into the soil via open channels. Here target types of vegetation will arise which are frequently not highly characteristic of river landscape but do have a high natural value. We are talking here about fresh water communities, meadow lands rich in flowers and humid poor grasslands.

Species may appear in the infiltration channels that are characteristic for fresh waters. Because the water has been pre-treated the quality is sufficient for the realisation of high natural assets including algae, Pond weed, Solomon's seal and Shore weed. Along the banks reed and rush vegetation can develop (see above for the characteristic species and communities). Around the infiltration channels, the soil will become wetter. The groundwater level will never drop below -0.5 metres in relation to ground level. On the one hand this means that a number of species of birds which now occur and which are found in drier environments, such as Partridge, White throat and Quail will disappear but on the other hand as the area becomes wetter, optimum conditions will be offered to meadow birds such as Ruff, Snipe, Black-tailed Godwit and Redshank[2]. It is expected that the natural assets of the area will be enhanced in terms of avifauna.

In terms of flora, meadow lands rich in flowers and the somewhat more humid poor grasslands will arise. Such grasslands are not simple to regenerate after intensive farming because of the level of fertilisation. Land-use and management measures will be required to begin with, possibly the laying of turf but in any event mowing and removal. The welling-up of nutrient-poor groundwater, which is made possible by the infiltration of pre-treated river water, can be of help.

When it comes to grassland rich in flowers, we are thinking of species from the rye grass family (Arrhenatherion elatioris) with species such as Artemisia absinthium, Barbarea, Alchemilla glabra, and Phyteuma comosum/tenerum and Myosotis ramosissima.

On impoverished grassland we are talking about species in the class Isoeto Nanojuncetea, the class of damp grassland Molinio Arrhenatheretea, the class of Parvocaricetea and Nardetalia. Impoverished grasslands are an important target of nature policy in the Netherlands. Many species in the Netherlands are dependent on non-fertilised, damp grassland habitats. At the same time these grasslands are important biotopes for insects.

[2] Names in English - see appendix 1 for Latin names.

4. PIM: IMPACTS ON ECONOMY AND WELFARE

In the Netherlands both nature conservation areas and agricultural area are being harmed by desiccation. The total surface of land that has become arid and which is an important natural asset was estimated to amount to 550 000 hectares in 1995. This area can be divided into a surface of 300 000 hectares of nature reserve and 250 000 hectares with an important role in nature conservation. Damage done to nature cannot be readily expressed in guilders, though the disappearance of wetland nature in particular is of course a loss of assets for society.

The surface of agricultural area affected by desiccation and the level of the damage are not known. So the direct economic losses in agriculture caused by desiccation are not known either. No economic calculation of the damage to agriculture and to biodiversity has been made and carries little weight in the debate.

Discussion of the usefulness of estimates of the economic value of biodiversity in the Netherlands is an old one. It started with the idea that statistics could prove that the conservation of biodiversity was an activity that made sense from an economic point of view. What's more, the method could prove that polluting activities that were usually defended on economic grounds had no backing whatsoever when biodiversity was considered as an economic factor. An example in the Netherlands is given in the paper on Green investment funds and organic agriculture.

But the drawbacks of defending biodiversity as an economic value are important. In the Netherlands, it is thought that estimation of the economic value of biodiversity and the damage to biodiversity will be an endless source of dispute. There are important methodological problems.

A second point is that in a highly populated country like the Netherlands, with an agricultural output at top levels and a population depending on industrialisation, the value of biodiversity will often be lower than the value of economic activities. In the Netherlands, defending biodiversity on the base of its economic value will result in a defeat of biodiversity and more resoundingly at that.

In our opinion biodiversity needs protection not because it has an economic value but because it has an ethical value and ethical values need protection even if this causes economic disadvantages. This conclusion prompts us to estimate the economic effects of pollution in a different way. In the case of desiccation, a remedy was concluded to be necessary on the basis of a political discussion. So the economic loss was not determined by calculating the level of the value of the economic damage, but by calculating what it would cost to put an end to the desiccation. In our situation the economic loss equals the costs of the remedy. Even so economic valuation can be important in some cases e.g. in the case of organic farming. An economic valuation can be highly valuable in the decision-making process to select and implement incentive measures.

The Dutch government has set a target for reducing desiccation by 25% in the year 2000. Measures to meet this target will cost about NLG 518 million. The targets and costs for 2010 are even higher (40%).

As mentioned the effects of desiccation are mainly caused by draining surface water from agricultural land and by abstracting groundwater for the production of drinking water. From 1996 onwards, the costs of desiccation reducing measures will be about NLG 90 million per annum (CE, 1990). These measures, which will be carried out at considerable expense, will cause damage to agriculture. If the groundwater level is restored to the level, which can stop the desiccation of nature, agriculture in the neighbouring area will be affected. The precise effects of hydrological circumstances are complex. In some areas the decline in agricultural production due to a (overly) high groundwater level in spring, has been estimated at 25% at most. The damage to farmers caused by restoring groundwater levels to preserve and restore biodiversity can run to 500 guilders per hectare. If one considers the total area, which suffers from desiccation, this could cost up to 212 million guilders per annum in compensation. These damages are estimated for the same crop being produced after the restoration of the groundwater levels. In practice a different crop production can be expected so the loss will be lower. The present article is confined to the contribution of groundwater abstraction to desiccation, so the effects on agriculture are beyond our remit. A tough discussion can be expected though on the compensation to farmers for stopping draining surface water.

The effects of the PIM project on employment are very limited. Some small differences are detectable but most of them have an limited impact and are temporary.

In developing a new system to produce drinking water the local water company studied several alternatives. The differences between the alternatives were not only relevant for the biodiversity. The differences were even more important for long-term planning, the quality of the end product, the chances for future expansion, etc.

The total investment needed to finance the PIM project amounts to NLG 427 million. The alternative project with abstraction of groundwater needs an investment of about NLG 130 million. However to use abstraction of groundwater a permit was needed. The alternative system using surface water without incorporation of biodiversity elements was estimated to need an investment of NLG 225 million.

The EU supports some of the investment. The Dutch government is supporting the project by making it partly a “green project”. This will give the entrepreneur, during a period of ten years, a reduction in interest rates amounting to about to 2%. The income tax relief given to consumers who (by means of participating in a green investment fund) amounts to 2%. (Assuming the normal income tax rates of the consumers is 50%).

It is not only the investment costs of the project that are important. The cost price of the end product will change. The main impact of PIM for industry consists in the new possibility of supplying grey water for industrial use. This water will have a lower cost price. Consumers will find that the price of drinking water (now NLG 1.59) will be affected by PIM and will increase by 10 cents every year up to the year 2000, after which the price will only be corrected for inflation. The present price of drinking water is not a fixed price and will be influenced by inflation, higher costs of purification in the near future, an increase in the tax on groundwater abstraction etc. It is expected that the difference in price will last only for a short period. Later the costs of the water prepared by the PIM system will be lower. An important reason for the preliminary high cost price of the water in the PIM is the fact the project is built to expand. The design of the equipment and the lay out are prepared for this expansion and the investment costs for

this expansion are part of the first phase of the project. After the expansion, the cost price of PIM water will be able to compete with the cost price of water derived from abstraction. The Dutch government is studying the effects of doubling the tax on groundwater. It is expected that the groundwater tax, at a level of 17 cents/m3, will rise in the near future. This will probably make the market price of the water prepared in the PIM project lower than the price of abstracted groundwater within a shorter time than expected.

5. IMPLEMENTATION OF INCENTIVE MEASURES AND CONTEXT

5.1 Identification of incentive measures

5.1.1 Green investment funds scheme

The initiative for tax-free green investment was taken by Parliament in the Netherlands, which considered it desirable to encourage Dutch citizens to become more involved in investing in green projects. The reasoning was that by offering fiscal incentives, more savings would be made available for these green projects. Such projects are difficult to finance, since they do not always provide the rate of returns the market expects. By ensuring that investors' returns on such projects are untaxed, this allows them to compete with the returns of regular investment funds on the market.

Possibilities of tax-free investing in green investment funds have been available in the Netherlands since 1 January 1995. This means that private investors are not taxed on their interest and dividend income, provided that this derives from investment in certain green investment funds. These green investment funds, in turn, have to invest in certain green projects. The aim of this tax concession is to encourage investment in major environmental projects, involving forests and nature areas, sustainable energy supplies and environmental technology.

Green investment funds will be required to meet the criteria the Dutch Central Bank normally sets for Dutch investment and credit institutions. The object and actual activities of green investment funds must primarily be the provision of funds to green projects: projects, which are important to the environment. To this end at least 70% of the total assets of green investment funds have to be invested in green projects. Green investment funds are not allowed to run green project themselves.

The Tax Authority assesses, on request, whether a credit or investment institution meets the criteria that have been set and whether they can therefore be designated as Green investment funds.

The legal provisions for Green projects give a definition of what a green project entails. It is defined as a cohesive whole of assets, including fixed and floating assets, which are technically necessary and solely serve to achieve and maintain the project. The projects have to be new projects, though a fundamental improvement to an existing project can also be regarded as a new project. For each project an individual statement (a Green Statement) will have to be applied for by the investment institution. These statements are being issued by the Ministry of Housing, Spatial Planning and the Environment and are valid for a maximum of ten years. They can though be renewed. The statement indicates the nature of the project and the project's assets as well as the period of validity.

If a project falls into one of the designated categories, those seeking funding for this can apply to a Green investment fund, frequently a bank. If the investment fund is prepared to provide the money, it then applies for a Green statement for the project in question to the Minister of Housing, Spatial Planning

and Environment. The Green statement is the basis on which the institution can award tax-free payments deriving form its investment in the project. This is different to normal saving or investment funds where interest received above f 1 000,- is taxed as income, with rates of 35%, 50% or even 60%. The Green investment fund submits an annual report to the Tax Authority.

The main aim of the incentive was:

- to create new projects in the field of nature conservation;

- to promote a change in economic activities so that these activities are performed in harmony with the surrounding ecological world. The idea was that the conservation of biodiversity involves more than the creation of national parks. Biodiversity is only guaranteed if society is able to perform its economic activities in such a way that nature is incorporated into it activities rather than being rejected;

- to promote the dissemination of technology for sustainable energy;

- to promote public involvement in environmental projects.

The projects under the scheme are not restricted to one economic sector. Many green projects can be found in the agricultural sector. But entrepreneurs and organisations outside this sector may also profit from the scheme: estate and nature reserve administrators, developers and manufacturers of ecological and sustainable energy equipment, public utilities and local authorities. Since November 1st 1996, sustainable construction is also covered by this scheme, enabling project developers, housing corporations, building contractors and private real estate owners to apply as well.

The designated categories are periodically updated. In any event the projects have to be new ones and the have to be in the Netherlands. Consideration is being given to whether projects in a limited number of other countries will be able to qualify in due course.

The following categories apply:

Projects in the field of nature, forestry, landscape and organic farming

projects aiming to develop and maintain forests
projects for the development and maintenance of nature reserves and country estates
projects aiming at producing and processing organic farming products
projects which aim at the industrial processing of agricultural raw materials into products which are not suitable for human and animal consumption (environmentally friendly agrification).

Projects in the field of sustainable energy

generation of energy from timber and energy-rich crops (biomass)
wind energy
solar energy
the extraction of geothermal energy
energy from water power
the use of heat pumps
storage of heat or cold in an aquifer
heat distribution networks for urban heating and the heating of greenhouses for market gardens (use of heat released in generating electricity)

Housing

with low energy consumption, built from environmentally-friendly building materials. Using ecologically benign building processes. An individual owner can thus obtain a so-called green mortgage, carrying a relatively low interest burden.

Other projects

These are projects which, in terms of their nature and environmental return, are on a par with those in the designated categories. Market players can put forward projects themselves for assessment.

The budget available for the scheme started in January 1995 with 25 million guilders, which allowed for Green projects of around one billion guilders. It took ten months to start the first Green Fund. At March 7, 1997 this of money amount had been used for a total of 186 projects. The application procedure for the Green statement and the annual reporting by green investment funds offers adequate opportunities for monitoring the budget. Approved projects are very diverse, with a strong focus on renewable energy, energy saving, organic farming, green mortgages, and nature projects. Also a number of recycling and waste processing projects have been included. More than 500 wind turbines have been issued with a Green statement. More than 230 organic farmers have successfully applied.

At the moment practically all Dutch banks have set up one or more Green investment funds. Investors and savers, too, are displaying a lot of enthusiasm. It is estimated that in practice money obtained from a green fund carries a 2% lower interest rate than the market rate. It is expected that a second billion guilders worth of green projects will be budgeted for 1997/1998.

The total benefit of the scheme is not so easily measured. Of course there are the benefits for the environment and nature. These are difficult to value in economic terms. Next to the obvious advantages, there is also the feeling of consumers who contribute to a environmentally friendlier society. They put their savings into these projects. As interest is lower than from regular funds, they relinquish some of their future income. Even with the tax-relief given, these green investment funds still have a lower rate of return than some other funds. The feeling of doing something for nature and future generations is one of the reasons the scheme has worked. Consumers wouldn't participate in this scheme if it didn't improve their well-being.

5.1.2 The use of a system of incentive measures

Desiccation in the Netherlands is a rather complex problem. Because of its complexity the abatement of desiccation needs a mixed system of incentives. As mentioned in Chapter 2 the desiccation problems harming biodiversity are the result of a lot of policy failures. To solve this problem it is not sufficient to abate just one or two of these failures by a single incentive. A successful solution for complex problems can only be found in a coherent approach with more than one incentive. In the case of groundwater abstraction the complex of instruments consists of:

- Introduction of a small groundwater extraction levy in 1995. The level of the tax is 17 cents per m^3 for industrial use of water and 34 cent for consumers. This tax put an end to groundwater being a free good. The disincentive makes it more profitable to use less groundwater. A side-effect of the tax is that lowering the use of water results in a lower energy input. Moreover, in some applications the tax encourages a shift from groundwater use

to the use of surface water. The reason for choosing the instrument of taxation is that it gives rise to a shift in the use to surface water for applications that need low quality water.

- Introduction of a permitting system for the extraction of groundwater. This system can be considered as creating property rights for the use of groundwater. The permitting system provides the opportunity to refuse permits in desiccated areas and depending on the application of the water. It promotes high level application of groundwater.

- Introduction of Green investment funds to promote investment in groundwater conservation and nature development. Green investment funds can be considered a positive incentive and have the effect of a soft loan. The Green investment funds scheme applies to economic activities that are performed in harmony with nature. The conditions for eligibility for the scheme are that groundwater extraction is reduced and space is left for nature and biodiversity in the water storage basin and wet infiltration area. The Green investment funds scheme allows the higher cost of this project (compared to the groundwater extraction alternative) to be partly offset.

This mixture of measures it is thought will result in a major decline in groundwater abstraction and its contribution to desiccation in the Netherlands.

5.1.3 Why choose Green Investment Funds?

There are various reasons for choosing the Green investment funds scheme to promote this projects of this type:

- The green investment system creates an effective financial incentive. This together with the other measures will create new drinking water production systems without groundwater extraction.

- The system implies an important role for consumers. It is their money that is used in the projects, the public awareness of the value of the environment and of nature is strongly promoted.

- The system uses the experiences and the accomplishments of the private financial sector. The role of the banks in judging projects is very important. They have experience in drawing conclusions on the economic viability of the project, the skills and quality of the management etc.

- The amount of money obtained from the private financial market and now available for investments in environmental and nature projects has increased significantly by introducing the system. At the end of 1997 we estimate the private sector has allocated more than NLG 3 000 000 000 for green projects. The potential volume of the green projects market originally was estimated much lower. The banks in the Netherlands have different opinions on the market volume. We think a potential volume of NLG 10 000 000 000 is a reasonable amount. Today the situation in the Netherlands is that the Green investment funds scheme can offer more money than there are green projects currently available. This is resulting in fierce competition between the Dutch banks offering low interest rates for green projects.

- The awareness of the financial world that environmental projects are business and that their clients (consumers) are interested in this market has very much changed their attitude to environmental issues.

5.2 Process of implementation and distributional effects

Ending groundwater extraction, creating new areas with biological values and the production of drinking water and industrial water in a sustainable way is a complicated process. This project is the result of a long development. In the past groundwater was available in sufficient amounts, it was easy to purify and it was cheap.

In the past the alternative source, surface water, was polluted, difficult to purify and consequently expensive. Reducing surface water pollution was necessary. This process took a long time. Meanwhile the effects of the extraction became visible and the pollution of groundwater increased because of large amounts of nitrates and phosphates used in agriculture. Doubts arose about groundwater as a commercial long-term safe source of drinking water. Moreover, the introduction of a tax on extraction and the permitting system made the water companies more willing to look for alternatives to groundwater extraction. The owner of PIM in the past extracted water from an area situated close to some conservation areas with important biological assets. He realised expansion of his production would not be allowed and in the long term his permit would be contested.

The Water Company however had a choice between various technological solutions to produce drinking water from groundwater. There were solutions without nature and solutions incorporating the facilities into a more natural way creating storage basins and infiltration wetlands. Applying the green investment funds scheme was a factor of weight in the decision.

The benefits of the incentive and the total project are clear. The water company will be able continue its activities and produce drinking water and industrial water at competitive prices in the long-term. The system used makes future capacity expansion of production possible. Consumers and industry in the area will be supplied in the future with high quality and safe drinking water and industrial water at reasonable prices. The further desiccation of the nature reserves in the area through groundwater abstraction will be stopped and higher levels of groundwater in the vicinity of the PIM infiltration area will result in an increase in biodiversity.

The creation of two new areas with good conditions for nature development is important for the protection of biodiversity. The farmers in the area, where in the past the groundwater extraction was located, will enjoy less desiccation of their fields. Finally, the new areas will be freely open to the public. The conclusion is that the beneficiaries of the project and of the incentive are long lasting and there are no conflicts between long-term and short-term interests.

But the project does not only have winners; there are losers too. Up to now the abstraction of groundwater is still common practice in the Netherlands. The introduction of biodiversity-friendly and safe technology for surface infiltration, may set a trend in the drinking water industry in the Netherlands. PIM was the first mover in applying this process. One can expect other water companies who wish to extend their production by groundwater abstractions will find it difficult to obtain new permits for less environment-friendly techniques.

The enforcement of the Green investment funds scheme is fairly simple. The role of the banks is dominant because the risk of losing the Green statement is a real threat. If a project loses its Green

Statement and a small part of the money from the funds is not loaned 'green', the fund will lose its green status. The consequences for the fund are dramatic. This threat makes banks very serious in their enforcement task. The banks are obliged to report to the Central Bank and to the Treasury. The results of these reports are checked by a special group of experts. In the case of PIM enforcement is fairly easy. The technology implies that the water company needs biodiversity for its production system. Biodiversity is in its own interests.

5.3 The role of information and uncertainly in the implementation process.

The lack of knowledge of the effects of the PIM project was diminished by drawing up an Environmental Impact Report paying attention to technology, nature, archaeological values etc. A research programme was started to solve problems and this was supported by the EU because the results of the research have a wider field of application in other member states. Hydrological and archaeological research was performed in the area in which the PIM project is situated.

The Environmental Impact Report was used by both the project owner and his shareholders who pressed for this solution. The Environmental Impact Report was also used for the local and national authorities' permitting process. The Environmental Impact Report refers to the lack of knowledge but even so the effects on nature were considered significant enough to defend the project. The project itself mounted a vigorous campaign to convince the public of the value of the project. Special papers, press releases and leaflets were distributed. The result is that people in the area are proud on their project. The public support is an important factor in the Green investment funds scheme because it is the money of the man in the street that is being spent. The funds are not state owned.

The project has been realised and the decisions taken and one of the conclusions drawn on the role of information is that the information that influences the decision-making is not always the most detailed scientific information. The lack of information on the minor points seemed to be no real impediment to taking decisions. The most important point, which is often underestimated, is the dissemination of information. The right information has to be made available in the right place.

5.4 Framework and context of implementation

The green investment funds scheme works with two types of projects. One type consists of projects which are generally recognised as having an important impact on the environment e.g. organic farming, sustainable energy etc. A list containing such projects is published and everyone knows that such projects will be eligible under the green investment funds scheme. A Green statement will be obtained almost automatically for these projects. The other type of projects are those specially designated by the Minister of Housing, Spatial Planning and the Environment. In practice it is not the Minister who decides on the application of the green investment funds scheme. The Minister is advised by a group of experts. Up to now the Minister has always followed that advice. The group of experts on biodiversity projects consists of scientists working in the field of biodiversity. No other disciplines are represented in the committee. No sectors organisations from branches of industry are represented nor are they members of the committee. Only one organisation is represented in the committee: the World Wildlife Fund. The aim of creating a committee comprising only experts on biodiversity is to reduce as much as possible formal, economic and social constraints in judging the biodiversity value of the project. It was this expert group that made a decisive recommendation on the PIM project

Projects are screened for their economic viability by the funds that provide the money. In the Netherlands today about ten commercial green funds are operating in open competition on the market. The screening of the government is confined to a check to see whether the implementation of the project is in agreement with the original planning. This screening is continued over a ten-year period. Modifications to a project are only allowed with government agreement. Only modifications increasing the 'greenness' of a project are accepted. If a project is not implemented in accordance with the requirements it will lose its green status. Loss of green status, results in loss of the financial base for the project. Loss of green status is a minor disaster for the bank running the green investment fund because customers will lose their tax relief. Clearly, this mechanism guarantees the banks have a serious interest in enforcing the green values of the project.

The social constraints or the cultural, historical and social resistance to the project was low. An important factor was that the excellent PR work of the water company and the fund resulted in public support. The idea that damage to nature reserves would be stopped and new valuable areas would be created made the public willing to support the project. Historical and archaeological values in the area were subject to a special screening study for their protection. The resistance of the farmers who had to move from the area was low because they were offered replacement fields as part of the PIM project. The farmers moved on a voluntary base.

The green investment funds scheme is quite popular among Dutch public. The money put in is more than can be spent on green loans. The scheme has contributed to increased awareness of environmental issues among the public at large. The conclusion is that the system fits in well with the Dutch social context.

Up to now no wide-scale evaluation of the scheme has been performed though it is being continuously monitored. This has resulted in some small modifications but these have not altered the general framework.

6. RELEVANT POLICY CONCLUSIONS

6.1 Lessons learned

This section assesses the Green investment funds scheme against the five criteria:

6.1.1 Effectiveness

The effectiveness of the scheme was high with reference to the PIM project on biodiversity. More than ten existing nature conservation areas threatened by desiccation will be protected and new areas will be developed. The effectiveness of the scheme on other projects generally is considered good. The scheme aims at biodiversity projects and at projects in which economic activities are implemented in a biodiversity-friendly way. This approach is new in the Netherlands.

6.1.2 Efficiency

The efficiency of the scheme with regard to biodiversity depends on the green investment costs incurred to achieve the objective. In the scheme the Government, green savers and the banks share costs. Government costs are lower compared with other incentive schemes.

6.1.3 Equity

Projects likely to produce high profits are not eligible for the green investment funds scheme. As the scheme is limited to projects with moderate profits generally no group will have an excessive advantage or disadvantage. The scheme applies to wide variety of projects so it is possible for there to be projects which are not completely equitable.

6.1.4 Administrative feasibility and costs

The administrative system is fairly simple. The scheme uses the administrative systems of the government, banks, central bank and the Treasury. Almost no new administration systems were developed but the existing ones were used. The banks, not the Government perform the key parts of the administrative process. They have experience in the money business and are better equipped than the government in this field. As there is a fierce competition between the diverse green funds, the banks are obliged to keep administrative costs low.

6.1.5 Acceptability

The acceptability rating of the green investment funds scheme by banks, project owners and public is very good. To begin with the banks were very reserved and it took six months before the first fund was put on the market. Public enthusiasm was such that competition forced the other banks to create green funds too.

The public welcomed the scheme with great enthusiasm. The first bank was offered far more money to spend than could be spent on available green projects. In the spring a special green investment fund to foster organic farming was brought to the market. Applications brought in ten times more money than was needed by the fund. The acceptability of the scheme is consequently very high.

Table 6.1 **Evaluation of the green investment scheme against policy aspects**

Policy aspect	**Effect in relation to the PIM project**	**Effect in relation to other projects**
Effectiveness	good	good
Economic efficiency	good	good
Equity	very good	good
Administrative costs	good	good
Acceptability	very good	very good

The conclusion is that in the Dutch context the green investment scheme is a strong and important incentive to promote projects with an impact on biodiversity. It must be mentioned that the protection of biodiversity is a complex problem. On the whole, a single incentive like the green investment funds scheme is not enough to achieve successful protection. As in the PIM project an integrated tackling of the problem is necessary. In the PIM project, the success of the scheme was supported by the groundwater tax scheme and by the permitting system for groundwater abstraction. In other projects the same experience was gained. Hence, the organic farming project was only a success thanks to a certification scheme.

Another lesson learned from experience with the scheme is that it has had a great impact on the attitude of public. The willingness of the public to support environmental and biodiversity projects was very much underestimated by the government, banks, NGOs and people working in the field of biodiversity.

6.2 Transferability of the experience

6.2.1 Representativeness

The project itself is representative of the situation in more OECD counties. The EU has supported the development of the technology for the PIM project because a wider field of application was expected. The type of projects supported by the green investment funds scheme are not specific to the

Dutch situation. The administrative implementation was performed in a co-operation between the banks and the government. Such co-operation offers opportunities in other OECD countries.

6.2.2 Obstacles

The concept of green investment is transferable to other OECD countries. However it requires a taxation scheme in which interest and dividend are taxed. Failing this, the advantages of the scheme can be exploited in a different way. Another very important point is the attitude of public. You need a public that is willing to offer money at a moderate rate of interest. The co-operation of the banks was no problem at all; their contribution was essential.

6.3 Policy advice for implementation

The incentive scheme scored well on efficiency, effectiveness and other policy aspects so it can be recommended to other policy makers. A green investment funds scheme needs to be carefully introduced. Before starting, a long period is needed to convince all the participants and to develop a properly working scheme. The scheme will be an optimum success if applied as an incentive together with other instruments.

The most important benefit of the green investment funds scheme is that the market generates a tremendous amount of money that is available for environmental projects. This amount of money could never be generated by the government or by the project owners. Moreover it is money generated at moderate expense to the government.

One impediment to the implementation of a green investment funds scheme is the tax system. Discussions with tax experts from other countries revealed that straightforward copying of the Dutch green investment funds scheme is not possible for most other tax systems. But it was clear that in a lot of other tax systems the effects and advantages of the green investments scheme can be achieved in a way that is slightly different to that in the Dutch scheme.

APPENDIX 1: NAMES OF SPECIES

PLANTS

Absintalsem	Artemisia absinthium
Bevertjes	Briza media
Bitter barbarakruid	Barbarea intermedia
Kale vrouwenmantel	Alchemilla glabra
Rapunzelklokje	Campanula rapunculus
Ruw vergeet-mij-nietje, Forget-me-not,	Myosotis ramosissima
Oeverkruid, Shore weed	Littorelletea

MAMMALS

Otter, otter	Lutra lutra
Waterspitsmuis, water shrew	Neomys fodiens

BIRDS

Blauwborst, Blue throat	Luscinia sveccia ssp. cyanecula
Grasmus, Whitethroat	Sylvia communis
Grutto, Godwit	Limosa limosa ssp. limosa
Kwartel, Quail	Coturnix coturnix
Kemphaan, Ruff	Philomachus pugnax
Patrijs, Partridge	Perdix perdix
Rietzanger, Sedge warbler	Acrocephalus schoenobaenus
Tureluur, Red shank	Tringa totanus
Watersnip, Snipe	Gallinago gallinago

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OECD Case Studies on the Design and Implementation of Incentive Measures for the Conservation and Sustainable Use of Biodiversity

All case studies are available on the OECD Internet Site at **http://www.oecd.org/env**

Country	Case study title
Australia	A Revolving Fund for Biodiversity Conservation in Australia
Austria	Austrian Case Study on Economic Incentive Measures in the Creation of the National Park Neusiedler See - Seewinkel: Summary
Austria	The Austrian Programme on Environmentally Sound and Sustainable Agriculture: Experiences and Consequences of Sustainable Use of Biodiversity in Austrian Agriculture
Canada	Revealing the Economic Value of Biodiversity: A New Incentive Measure to Conserve and Protect It
Canada	Using the Income Tax Act of Canada to Promote Biodiversity and Sensitive Lands Conservation
Denmark	Economic Incentives for the Transformation of Privately Cultivated Forest Areas into Strict (Untouched) Forest Reserves
Finland	The Act of the Financing of Sustainable Forestry and the Development of Forest Certification
France	A Cost-Benefit Analysis of Biodiversity Conservation Programmes in the Garonne Valley
Germany	UNESCO Biosphere Reserves Schorfheide-Chorin and Rhön
Greece	Incentives for the Conservation of the Nesting Grounds of the Sea Turtle *Caretta caretta* in Laganas Bay, Zakynthos, Greece
Japan	The Case of Oze Area: Case Study on the Japanese Experience Concerning Economic Aspects of Conserving Biodiversity
Korea	Case Study on Korean Experiences Relating to the Conservation of Biodiversity in Mount Chiri, with Special Attention to the Poaching of Bears
Mexico	Incitations Economiques pour la Protection des Especes de la Vie Sauvage au Mexique: Le cas de l'Espece *Ovis canadensis*
Netherlands	Green Investment Funds: Organic Farming
Netherlands	Green Investment Funds: PIM Project
New Zealand	Conservation of the Pae O Te Rangi Area
Norway	Valuation of Benefits Connected to Conservation or Improvement of Environmental Quality in Local Watercourses in Norway
Poland	Case Study on the Polish Experiences Relating to the Implementation of Economic Incentive Measures to Promote the Conservation and Sustainable Use of Biodiversity in the Biebrza Valley, with Special Attention to the Biebrza National Park
Turkey	The Development of Appropriate Methods for Community Forestry in Turkey
UK	Heathland Management in the UK
US	US Experiences with Incentive Measures to Promote the Conservation of Wetlands
US	Individual Transferable Quotas as an Incentive Measure for the Conservation and the Sustainable Use of Marine Biodiversity