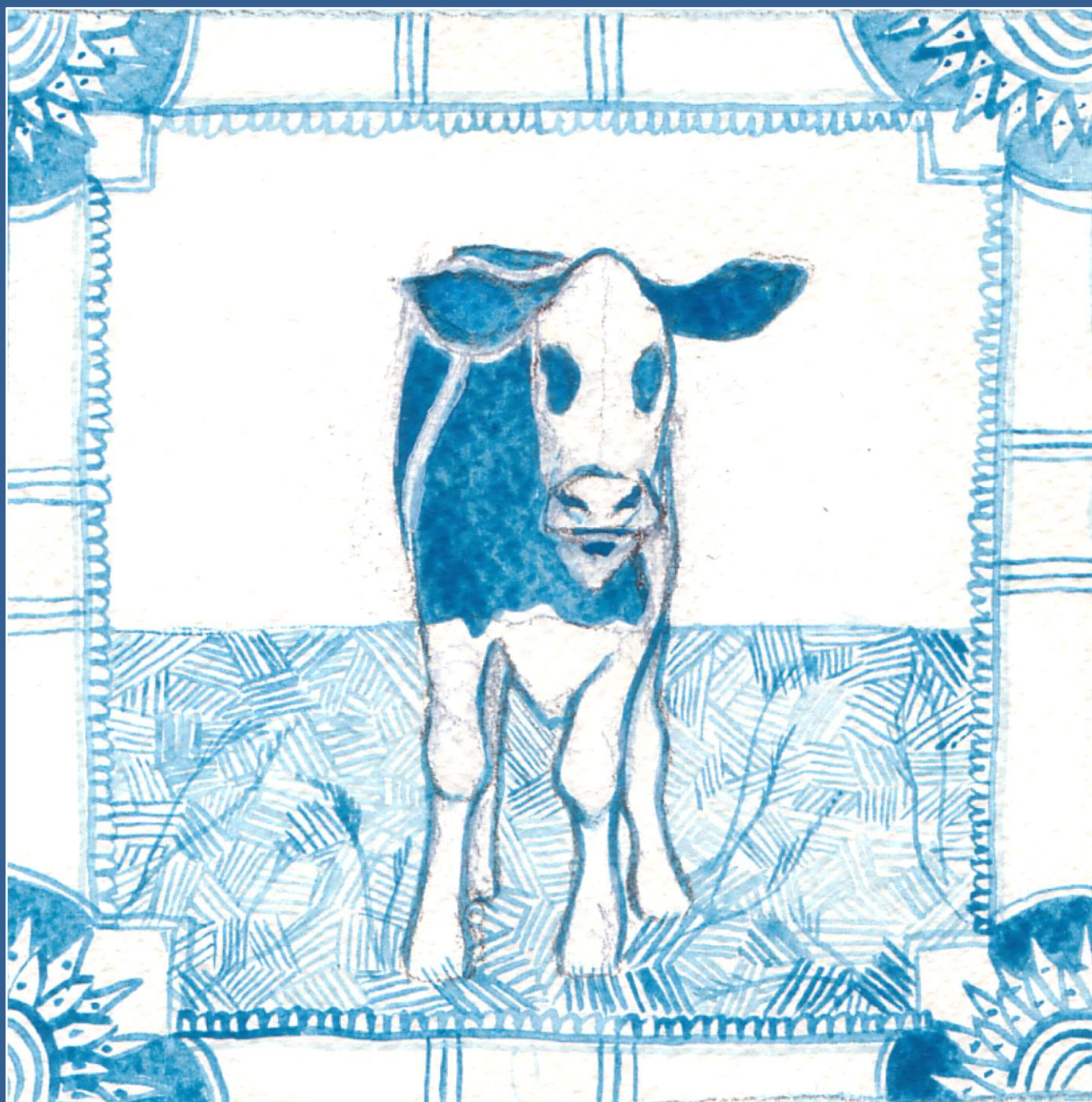




Hoogheemraadschap van Delfland



Waterkader
Haaglanden



Farmers as water managers - Financial Methods

European Union



The European Regional Development Fund

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Hoogheemraadschap van Delfland

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Executive Summary

Introduction

The aim of the Aquarius project is to share expertise and experiences that can be used in the pilot regions. The results provide new insights that can be relevant for various Aquarius partners. It helps them strengthen and improve their knowledge in making decisions.

All Aquarius partners agreed that we need farmers to act as water managers to achieve water management goals and to face changing climatic conditions. Successful water management together with farmers depends on different factors, including the economic conditions.

Questions to be answered

How do we get farmers and water authorities willing to provide services that prevent flooding, water shortages or leaching of nutrients?

- What are the (financial) barriers for farmers to act as sustainable water managers?
- What is needed to resolve these barriers?

Exchange of knowledge and experiences

Regional characteristics

- Institutions, types of measures and spatial characteristics are of influence on successful water management executed by farmers.

Regulations and tools

- Ecosystem services can provide important benefits to the environment.
- Agri-environmental schemes (AES) are established on a National and regional scale to encourage farmers to provide ecosystem services.
- Ecosystem services go beyond Good Agricultural Practices (GAP): farmers have to comply with environmental, food safety and animal welfare standards and have to borne the compliance costs (Polluters-Pays-Principle).
- Funding of ecosystem services that will falsify competition on the Common Market is considered as state aid.
- Government payments of no more than EUR 7.500 for agricultural enterprises over a period of three years are not regarded as state aid (Minimis aid).
- In order to prevent any abuse, the Minimis aid need to be transparant: the aid amount can be calculated precisely in advance without needing to carrying out a risk assessment.
- There are different European Community guidelines on state aid that may be of interest for granting ecosystem services.

Transnational findings

- The Aquarius partners distinguished different agri-environmental measures to prevent flooding, water shortages or leaching of nutrients.
- The Aquarius partners identified and discussed farmers' interest and the (dis)advantages of four financial key methods: Green and Blue Services concept, Capital maintenance, Market oriented model and Insurance model, as important to enable farmers to act as sustainable water managers.

Transnational conclusions

More incentives are needed to encourage farmers to act as water managers (motivation factors). The Aquarius partners identified some important (economic) motivation factors:

Motivation factors to get farmers interested

- It is important that there is a good cooperation between farmers and other partners in the region and therefore it is necessary to seek for win-win situations.
- Farmers are interested to act as sustainable water managers when it is profitable, e.g. sufficient income, water of good quality for irrigation.

Motivation factors to enable farmers to act as sustainable water managers

- There need to be more synergy between CAP and Environmental policies to fund water-related ecosystem services.
- There need to be more synergy between Cross Compliance and AES: less overlap and taking into account the environmental cost-benefit relationship in agriculture.
- The AES and the Catalogue of Green and Blue Services should match with local characteristics, farmers' interest and water management: more water-related measures need to be included in the schemes and more activities in a cluster or package of measures need to be compensated for.
- Compensation payments for agricultural enterprises should be more incentive and fair, so that water management become a commercially interesting activity for farmers: higher maximum payments for farmers acting as sustainable water managers.
- The focus on government subsidies only will not be sufficient to resolve the barriers for farmers to act as water managers. A combination of government subsidies and private money may be necessary to keep the farmers as food producers, landscape and water managers in the area.



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1 INTRODUCTION

The Aquarius project has a common aim to find and implement sustainable, integrated land-water management through engaging with farmers.

Climate changes and changing European agricultural, rural and water policy pose new opportunities for, and challenges to, farmers in the North Sea Region. The challenges vary in the different pilot areas of the project.

The main problems of climate change in the pilot regions are flooding, water shortages and leaching of nutrients.

The seven pilot regions and the impact of climate changes

- **Midden-Delfland** (The Netherlands) – an inland west coast catchment, dominated by dairy farms although it also has strong cultural and recreational values - facing flooding pressures and eutrophication.
- **Mariager Fjord** (Denmark) – a coastal catchment draining into a fjord with mixed farming, forestry and recreational use - facing nutrient pollution pressures.
- **Veenkoloniën** (Drenthe, The Netherlands) – an inland catchment with mainly arable crops - facing water shortages due to irrigation and drinking water demand and nitrification of surface waters due to draining peat bogs.
- **Ilmenau-Jetzeel** (Germany) – an inland geest catchment with mainly arable crops and some forestry - facing water shortages due to irrigation and pollution of groundwater supplies.
- **Vestre Vansjø** (Norway) – a coastal catchment with mainly arable crops, which services the capital Oslo with drinking water and has high recreational values – facing nutrient pollution pressures
- **Tarland Catchment** (Scotland) – an inland east coast catchment with mixed farming and forestry – facing morphological alterations resulting in flooding and nutrient pollution pressures.
- **Smedjeån Catchment** (Sweden) – a coastal plain catchment with mixed farming, forestry and hydropower production – facing water shortages in the upper catchment and flooding in the lower catchment.

(Reference: Baseline report. Aquarius: Farmers as Water Managers Project. January 2010.)

The European Union plays an important role in successful land-water management partnership. The Common Agricultural Policy, Rural Development Plan and state aid test –provides the European framework for opportunities and challenges to be explored.

European Common Agricultural Policy (CAP)

The EU farm ministers adopted a fundamental reform of the Common Agricultural Policy five years ago. Farmers are no longer paid just to produce food. The CAP is demand driven. It takes consumers and taxpayers concerns fully into account, while giving EU farmers the freedom to produce what the market wants. The vast majority of aid to farmers is paid independently of what or how much they produce. Severing the link between subsidies and production ('decoupling') will make EU farmers more competitive and market oriented. They will be free to produce according to what is most profitable for them while enjoying a stable income.

In addition, farmers have to respect environmental, food safety and animal welfare standards (Good Agricultural Practices (GAP)). Farmers who fail to comply with these standards face reductions in their direct payments, a condition known as **cross-compliance**.

Rural Development Plan (RDP)

Payments under RDP aim at delivering environmental services through agri-environmental measures in rural areas and preserving land management. One of the strategic issues in RDP is water management, related to the EU Water Framework Directive (WFD). All these activities are supposed to contribute to a sustainable rural development, including the protection and improvement of the environmental resources. Co-financed activities should clearly target EU priorities such as combating climate change, enhancing water quality, or reducing the risk or impact of natural disasters.

EU policy on flood-risk management

The CAP/RDP includes provisions for Member States to use funds for flood-related measures. States may define the type of flood measures themselves.

State aid test

Control over government aid is one of the main parts of the policy on competition within the EU, and this includes the agricultural sector. The purpose of the policy is to create equal preconditions on competition for all sectors and countries on the Common Market. Measures that will falsify competition by giving preferential treatment to certain companies are not allowed. The procedural regulation on state aid stipulates that any aid or aid scheme must be notified to and approved by the European Commission before being implemented.

The European Commission (EC) stimulates countries to draw up a *Catalogue of Green and Blue Services*, which can be used by lower level governments. The catalogue consist green and blue services that have been approved by the EC. For further information please refer to chapter 5.

Appropriate institutional, economic and governance arrangements enables farmers to take an active role in water management through partnerships with other farmers, water boards, local and national government.

Through transnational cooperation the Aquarius partners share their knowledge and experiences for identifying the barriers to successful land-water management partnership and developing solutions for farmers to act as sustainable water managers according to what is most profitable for them.



2 THE PHASE 'B' KEY FINANCIAL METHODS

2.1 Purpose

The overall goal of the Aquarius project is to enable farmers to act as sustainable water managers under changing climatic conditions. Successful land-water management through engaging with farmers depend partly on the existence of economic arrangements to ensure profitable farming.

The Phase 'B' Key financial methods therefore set out to provide an:

- Identification and description of financial key methods for farmers to deal with increased temperatures, nutrient losses, flooding and droughts in the future.

This means that financial solutions, including new market oriented approaches, need to be identified and developed to achieve a profitable farming in a good water environment.

The question is: how do we get farmers and water authorities willing to provide services that prevent flooding, water shortages or leaching of nutrients?

- *What are the (financial) barriers for farmers to act as sustainable water managers?*
- *What is needed to resolve these barriers?*

2.2 Method

The expert network on the financial issue set out some shared transnational questions for each pilot region to answer. The answers of all pilot regions were brought together into a discussion paper "Financial".

The discussion paper "Financial" formed the basis of discussion at the transnational workshop held in Delft on 9 -11th June 2010. The workshop shared information on:

- Options for successful environmental services in water management.
- Policies and strategies necessary for water related services to be carried out by farmers, within the European context.
- Different mechanisms of compensation for water related services.

In the Delft workshop financial key methods were identified. In addition the expert network "financial methods" agreed to provide a written supplement with their knowledge and experiences concerning advantages and disadvantages of the different financial key methods.

This report "Farmers as watermanagers - Financial methods" is based on:

- the transnational answers on the questionnaire;
- the information recorded during the Delft workshop;
- the additional information in the transnational supplement;
- literature.

The report has been verified by representatives of each region as a true account of the transnational learning.

3 REGIONAL CHARACTERISTICS

The characteristics of a country or region determine to a great extent the design of successful land-water management through engaging with farmers, e.g. institutions, types of measures, spatial characteristics.

3.1 Institutions

The institutions differ per country:

- Departments (e.g. environment, agriculture) are responsible for the implementation of European Directives (Water Framework Directive (WFD), Nitrate Directive, Flood Directive, CAP) in national (water) guidelines and national (water) criteria. Some Departments are also responsible for national waters (e.g. NL).
- Central agencies, regional and local authorities and municipalities are responsible for regional and local waters, implementation of national (water) guidelines and criteria, implementation of measures and responsible for permits, supervision and control. In some countries there are cooperative bodies (e.g. DE) for specific tasks (e.g. advise, information, administration). For example in the Netherlands where Provinces are responsible for regional waters and have delegated a part of their responsibility to water boards.
- Private parties are also responsible for water, e.g.: water users (e.g. citizens, landowners, industry), NGO's, clubs for specific topics (e.g. nature protection, water recreation, fishing). For example in Scotland where Scottish Water, a public-private partnership, is providing Scottish consumers with safe drinking water and sanitary conditions.

3.2 Types of measures

Measures to prevent flooding are important in the pilot regions Midden-Delfland (NL) and Tarland (UK). While measures to prevent diffuse pollution are more important in the pilot regions Mariager Fjord (DK) and Vestre Vansjø (NO). And measures to prevent water shortage are needed in the pilot regions Veenkoloniën (NL), the upper catchment of Smedjeå (SE) and the inland geest catchment Ilmenau-Jetzeel (DE).

3.3 Spatial characteristics

In densely populated areas or areas where land is scarce land prices are high and land demanding measures, like flood preventing areas, are expensive. For more discussion please refer to "European blues. Blue services in an European perspective" (2009).

Peak-flow storage

The possibilities for peak-flow storage can be represented by the following formula:

$F_{(chance)}$ = frequency of flooding, land price, damage caused by flooding, institutions (e.g. flood protection regulated by law), transaction costs.

(Reference: European blues. Blue services in an European perspective. August 2009.)

4 REGULATIONS AND TOOLS

4.1 The ecosystem services concept

The importance of the benefits that nature provides to human societies is widely recognized. Researchers and policy-makers tried to conceptualize these important functions of nature. Concepts like ecosystem goods and services, landscape services, environmental services are increasingly being used worldwide. The abundance of terms, the diversity of approaches to their application and, in some cases, the lack of consensus in relation to their definition, seem to be leading to a certain conceptual complexity that can hinder the exchange of knowledge and experience between professionals on this topic.

The term ecosystem service is the most used among researchers and policy-makers. Nowadays, it is highly accepted that beside natural ecosystems also human-modified ecosystems, such as urban open spaces and farmland, can provide important benefits to the environment and thus, improve the quality of life of human communities. Agriculture can be defined as a managed ecosystem and farms can deliver ecosystem services.

For many centuries, these services have been taken for granted, being ignored by markets and dissociated from pricing. However, economic valuation of services can be used as a powerful tool to help decision-makers decide between different policies, e.g. promoting specific land use changes instead of others, or encouraging certain management regimes through incentives. The development of Agri-environmental Schemes (AES) in the European Union is an example of this economic approach to nature conservation.

Ecosystem services are nature- (green) and water-related (blue) measures to reach objectives for landscape, nature, cultural heritage and water. Ecosystem services related to farming activities can be e.g. zero or reduced nutrient supply, postponed mowing (after breeding season) or mowing once a year, natural crop rotation, local water level control, management of tracks and ditches, water (quality) management, temporary or occasional flooding of farmland, organic farming, capacity building, organization and education of farmers, extensive grazing, reduced emission of greenhouse gasses, active greening, market development for regional products, investments on traditional farm buildings and roads, reduced herbicide use, conversion from arable land to extensive grassland, forest erosion protection and conversion of coniferous to mixed forest, re-introduction of traditional types of cattle, management and renovation of archaeological sites, etc.



4.2 Agri-environmental Schemes (AES)

In the context of the European Union, AES consist basically a set of measures designed at national or regional level, established with the objective to encourage farmers to protect and enhance the environment on their farmland. Agri-environmental measures go beyond statutory environmental requirements, defined in the Good Farming Practice codes, which act as a baseline level. Thus, measures are optional for farmers, who are paid for the loss of income or the additional costs derived from the adoption of environmentally-friendly farming techniques. Since the EEC Regulation 2078/1992, all EU Member States are obliged to develop agri-environmental schemes as part of their rural development policies.

The EU considers AES as an incentive for environmental services: "Agri-environment schemes encourage farmers to provide environmental services which go beyond following good agricultural practice and basic legal standards". Farmers willing to participate in AES sign a contract with the administration for a five year minimum period, and the payments are co-financed by the EU and the Member States.

(Reference: PLUREL, 2008. European lessons for Green and Blue Services in The Netherlands. Working paper, June 2008.)

Main categories of AES identified by the EU Commission (2005):

- A. Productive land management: input reduction, organic farming, extensification of livestock, conversion of arable land to grassland and crop rotation, under sowing and cover strips (buffer strips) and preventing erosion and fire, actions in areas of special biodiversity/nature interest, genetic diversity, maintenance of existing sustainable and extensive systems, maintenance of farmed landscape, water use reduction.
- B. Non productive land management: set-aside, upkeep of abandoned farmland and woodland, maintenance of the countryside and landscape features, public access.

(Reference: <http://www.ieep.eu/publications/pdfs/crosscompliance/D13%20Cross%20compliance%20and%20agri-environment%20schemes.pdf>)

4.3 Baseline or Reference level for agri-environmental measures

Since 2005 all farmers receiving direct payments are subject to compulsory cross-compliance. Cross compliance includes two elements:

- Statutory Management Requirements: These requirements refer to 18 legislative standards in the field of the environment, food safety, animal and plant health and animal welfare.
- Good Agricultural and environmental conditions: The obligation of keeping land in good Agricultural and environmental Conditions refers to a range of standards related to soil protection, maintenance of soil organic matter and structure, avoiding the deterioration of habitats and water management.

Cross-compliance represents the "baseline" or "reference level" for agri-environmental measures. For all requirements falling under cross-compliance, the compliance costs have to be borne by farmers ("Polluters-Pays-Principle").

4.4 State aid

State aid refers to forms of assistance from a public body, or publicly-funded body, given to undertakings on a discretionary basis, with the potential to distort competition and affect trade between member states of the European Union. Any advantage conferred by the state is regarded as state aid where it:

- Confers an economic advantage upon the recipient.
- Is granted selectively to certain companies or products.
- May distort competition.
- Affects trade between Member States

The 'State aid rules' are set out by the European Commission and comprise various articles of the Treaty on the Functioning of the European Union (TFEU), regulations, frameworks and guidelines - which set out what aid can be given. The European Commission governs Member States' compliance with these rules and must be notified of all schemes involving State aid. State aid granted without Commission approval is viewed as unlawful and may be subject to repayment - by the aid recipient.

Because agricultural holdings already receive subsidies based on the CAP, the agricultural holdings face more limitations concerning state aid.

4.4.1 De Minimis aid and transparency

Article 88(3) of the Treaty establishing the European Community requires state aid to be notified to the European Commission so that it can assess whether the aid is compatible with the Common Market in the light of Article 87(1). However, under Regulation (EC) No 994/98 certain categories of aid can be exempted from the notification requirement.

The De minimis rule was introduced in order to exempt small aid amounts. It sets a ceiling below which aid is deemed not to fall within the scope of Article 87(1) and is therefore exempt from the notification requirement laid down in Article 88(3):

- Aid of no more than EUR 200.000 (medium-sized enterprises), EUR 7.500 (agricultural enterprises) and EUR 100.000 (road transport) granted over a period of three years is not regarded as state aid.
- In order to prevent any abuse, the Regulation applies only to transparent de Minimis aid. Aid is regarded as transparent when the amount can be calculated precisely in advance without needing to carry out a risk assessment. The following count as transparent aid:
 - aid comprised in loans when the amount has been calculated on the basis of market interest rates prevailing at the time of the grant;
 - aid comprised in capital injections if the total amount of the public injection does not exceed the de Minimis ceiling.
 - aid comprised in risk-capital measures if the risk-capital scheme concerned provides capital only up to the de Minimis ceiling to each target undertaking.
 - aid provided under a loan-guarantee scheme when the guaranteed part of the underlying loan does not exceed EUR 1.500.000. However, Member States can provide loan guarantees on amounts of more than EUR 1.500.000 if they can show, using a methodology accepted by the Commission, that the aid element does not exceed EUR 200.000.
- The Regulation does not apply to aid for fisheries and aquaculture, the primary production of agricultural products, export-related activities, the coal sector, the acquisition of road freight transport vehicles or firms in difficulty, or to aid tied to the use of domestic over imported goods.
- It applies to aid granted to firms in all other sectors, including transport and, on certain conditions, for the processing and marketing of agricultural products.

(Reference: http://europa.eu/legislation_summaries/competition/state_aid/l26121_en.htm)

4.4.2 European Community guidelines

Three European community guidelines may be of interest for granting ecosystem or agri-environmental services:

- Community guidelines for state aid in the agriculture and forestry sector 2007-13. State aid is categorised in the guidelines as follows:
 - rural development measures;
 - aid for risk and crisis management;
 - other types of aid;

- aid for the forestry sector.
(http://europa.eu/legislation_summaries/agriculture/general_framework/l24281_en.htm)
- Community guidelines on State aid for environmental protection. The Commission has identified a series of measures for which State aid may be considered to be compatible with the internal market:
 - aid for undertakings which go beyond Community standards or which increase the level of environmental protection in the absence of Community standards;
 - aid for the acquisition of new transport vehicles which go beyond Community standards or which increase the level of environmental protection in the absence of Community standards;
 - aid for early adaptation to future Community standards;
 - aid for environmental studies;
 - aid for energy saving;
 - aid for renewable energy sources;
 - aid for cogeneration and energy-efficient district heating;
 - aid for waste management;
 - aid for the remediation of contaminated sites;
 - aid for the relocation of undertakings;
 - aid involved in tradable permit schemes;
 - aid in the form of reductions of or exemptions from environmental taxes.
(http://europa.eu/legislation_summaries/competition/state_aid/ev0003_en.htm)
- Community framework for State aid for Research and Development. The Community framework contributes directly to the strategy for growth and jobs by:
 - extending the field of R&D to that of innovation;
 - stimulating research, development and innovation without distorting competition;
 - encouraging new investment in very specific domains such as aid to young, innovative companies or innovation clusters.
(http://europa.eu/legislation_summaries/research_innovation/general_framework/l26078_en.htm)



5 TRANSNATIONAL FINDINGS

5.1 Land-water management measures

The Aquarius partners mentioned several water related measures needed.

Pilot regions	Main problems	Land-water management measures
Mariager Fjord (Denmark)	<ul style="list-style-type: none"> – Leaching of nutrients 	<ul style="list-style-type: none"> ▪ Cultivation-free buffer zones along watercourses, lakes ▪ Create wetlands on farmland ▪ Create river valley on farmland ▪ Planting catch crops (additional, in combination) ▪ Ban on certain soil cultivation methods in autumn ▪ Temporarily ban on ploughing meadows ▪ Improvement of physical conditions watercourses
Midden-Delfland (The Netherlands)	<ul style="list-style-type: none"> – Flooding pressures – Leaching of nutrients 	<ul style="list-style-type: none"> ▪ Water level control ▪ Mowing and removal of grass and reed along watercourses ▪ Dredging of watercourses ▪ Maintenance of fences
Veenkoloniën (Drenthe, The Netherlands)	<ul style="list-style-type: none"> – Water shortages – Nitrification of surface water 	<ul style="list-style-type: none"> ▪ Sprinkling (higher yields) ▪ Seasonal storage (pilot) ▪ Buffer strips, field margins along ditches
Ilmenau-Jetzeel (Germany)	<ul style="list-style-type: none"> – Water shortages – Eutrophication of groundwater supplies 	<ul style="list-style-type: none"> ▪ Implementation of WFD measures ▪ Maintenance of watercourses ▪ Irrigation ▪ Water use and water supply ▪ Flood protection ▪ Drinking water protection ▪ Advising ▪ Monitoring ▪ N-reduction
Vestre Vansjø (Norway)	<ul style="list-style-type: none"> – Eutrophication 	<ul style="list-style-type: none"> ▪ Implementation of measures
Tarland Catchment (Scotland)	<ul style="list-style-type: none"> – Flooding – Eutrophication 	<ul style="list-style-type: none"> ▪ Nutrient management ▪ Soil & Water Management ▪ Manure/Slurry Storage ▪ Water margins & enhances Riparian Buffer Areas ▪ Management of Flood Plains ▪ Treat Run-Off of Pollutants in Farm Wetlands ▪ Create, Restore and Manage Wetlands ▪ Arable Reversion to Grassland
Smedjeån Catchment (Sweden)	<ul style="list-style-type: none"> – Water shortages in the upper catchment – Flooding in the lower catchment 	<ul style="list-style-type: none"> ▪ Drinking water protection ▪ Improvement of water quality ▪ Implementation of WFD measures ▪ Buffer strips ▪ Reduced nitrogen leaching (catch crops, spring tillage) ▪ Wetlands, ponds ▪ Monitoring ▪ Maintenance of watercourses ▪ Irrigation ▪ Wastewater treatment

These measures concerns:

- Water quality or water quantity.
- Surface water, (deep and upper) ground water, wastewater/effluent.
- Different functions of water: natural water, irrigation water, swimming water, drinking water, process water.

The impact of these measures is either direct or indirect on water quality or quantity.

Types of water management measures

Different types of water management measures concerning water quality and quantity can be distinguished:

- **Water conservation:**
 - Rain storage: rain storage temporarily raises ground- and surface water levels, in combination with crop rotation plan
 - Seasonal storage: storage of water in the ground or in the open, in combination with extensive farming
- **Peak flow storage:** temporary storage of water on land to prevent flooding downstream, in combination with extensive grassland
- **Calamity-prevention storage:** areas have to be kept open to assure a vast storage capacity if necessary
- **Supply of clean water:**
 - The farmer upstream has to reduce the use of manure, fertiliser and/or pesticides in order to meet the water quality standards of the requesting party, in combination with organic farming
 - The supplying party should not be dependent on water upstream, in combination with rain storage and organic farming.
- **Strengthening the landscape:**
 - Mountainous areas: reduction of erosion, in combination with environmental schemes or adjustment of farm practices
 - Drought-sensitive areas: preserving peat polders, maintaining ditches, in combination with environmental schemes or adjustment of farm practices
- **Cleaning of waste water or drain water:** Farmland as treatment plants.

(Reference: European blues. Blue services in an European perspective. August 2009.)



Summarized, the focus in the Delft workshop involves the following land-water management measures:

- Create/restore/manage wetlands as treatment plant for water purification (wastewater, drain water).
- Water conservation: irrigation, to prevent flooding, fresh water supply.
- To enlarge and manage the floodplains along rivers and minor watercourses.
- Restoration and management of river valleys or meadows.
- Services that strengthen the landscape: adjustment of farm practices (nutrient management, organic farming, catch crop, soil cultivation, crop rotation), reduction of erosion, preservation of peat soil.
- Green and Blue Services: dredging watercourses, manure/slurry storage, enhance and maintenance of water margins & riparian buffer areas, mowing and processing of reed and grass along watercourses.
- Passive measures: absence of agricultural activities on farmland.

Climate change increases the risk of flooding. All Aquarius partners agreed that their pilot region have to adapt to higher flood risk. Using agricultural land for water conservation, peak flow storage and calamity-prevention storage can be a solution and "farmers as water managers" are considered as important service providers in preventing flood risk.

Other effects of climate change mentioned in the questionnaire are greenhouse gasses (NL, DK), drought (NL, DE, SE) and water quality problems: agricultural emissions (SE, DK), oxidizing peat soil (Delfland), water shortage for irrigation (SE, Drenthe, DE), inlet of surface water of bad quality (Delfland).

5.2 National or regional agri-environmental schemes

Agri-environmental schemes consist a set of measures designed at national or regional level. All Aquarius partners make use of a national or regional scheme, a programme or catalogue with voluntary 'packages' of measures for which subsidies can be obtained:

- Sweden has the "**Swedish Agri-environmental Scheme**", including measures as buffer strips, reduced nitrogen leaching (catch crops, spring tillage), wetland & ponds.
- Scotland has the "**Scotland Rural Development Programme (SRDP)**", a catalogue of different measures, such as nutrient management, soil & water management, manure/slurry storage, water margins & enhances riparian buffer areas, management of flood plains, treat run-off of pollutants in farm wetlands, create/restore/manage wetlands, arable reversion to grassland. (www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities)
- Norway has the "**Regional Environmental Programme**", including measures as constructed wetlands.
- In Germany there is a **Catalogue for preservation nature**, but not for water services.
- Denmark has introduced an idea on how "nitrogen quota's" could be handled through an integrated advice where a catalogue of different measures for reducing N and P are to be used depending on what farm and what catchment they face. However, the idea was not implemented in the first plan period of the WFD because an appropriate tool for handling water quality is still missing. (http://wss3.landscentret.dk/websteder/Aquarius/Lead%20partner/Workshop%20Delft%20June%202010/Financiel%20network/hso_bip_hso20090825_GAP-manual_Effekter_m_rullegardin_Somrader_IAW_Engelsk.xls)
- The Netherlands have developed the "**Dutch Catalogue Green Blue Services**", that includes services as water level control, mowing and transport of grass and reed along watercourses, dredging watercourses and maintenance of fences to protect water margins. For more information please refer to subsection 5.3.2. and <http://www.groenblauwediensten.nl/pages/home.aspx>

Dutch Catalogue Green Blue Services:

The Dutch catalogue is a set of measures (605) for reaching objectives for landscape, nature, cultural heritage and water and a table with maximum prices for these measures. The catalogue is a guideline for authorities with which local schemes can be designed. The catalogue as a whole has been approved by Brussels and is to be updated each year. The local government can select the measures they need for a local or regional scheme. The National Park Authorities in the UK make joint applications for their schemes which functions in a similar way. Drawback of the catalogue is that it is lagging behind the actual development in prices. The catalogue is good, but needs practical improvement and extension of the measures. More information is on www.groenblauwediensten.nl (in Dutch)

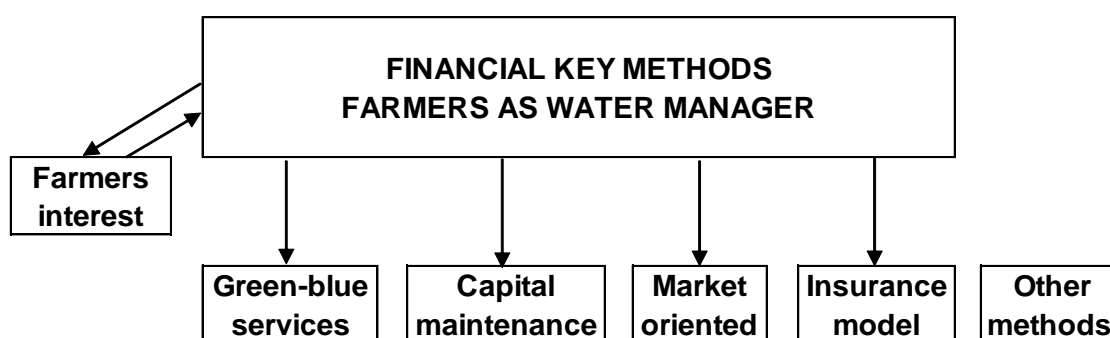


5.3 Financial key methods

5.3.1 Win-win situation

To get the farmers willing to provide a service that prevent flooding, water shortage or leaching of nutrients it is important to formulate a shared vision, in which wishes and opportunities of farmers and other stakeholders are described. Commitment of parties is necessary to make it work. Schemes should match with the local situation and farming culture, e.g.: traditional agricultural norms may be against the use of fertile land for water storage. Allow farmers and other stakeholders to come with their own ideas and find a way to make water management a commercially interesting activity for farmers.

Knowledge and experiences shared in the Aquarius project focused on four financial key methods: Green blue services concept, Capital maintenance, Market oriented and Insurance model.



5.3.2 Green and Blue Services concept (GBS)

The Green and Blue Services (GBS) concept is an example of an economic approach to nature conservation. The concepts GBS and AES do not completely overlap. AES can be seen as a purely public system of payment for Green and Blue Services. GBS include possibilities for private funding and also include services that are not paid for at all. In practice, the Green and Blue Services present some distinctive features that make them different from the "standard" national AES:

- The funds for GBS are intended to originate at lower administrative levels while in the case of national AES linked to CAP, funds are provided mostly by the European Union and the national government.
- Green and Blue Services initiatives often explicitly include the possibility of private financial contributions (area funds).
- The measures and schemes are generally developed together with farmers and other local stakeholders, with the aim to match measures with the local landscape, ecology and the local needs.
- Some of the GBS initiatives are an expression of the need for a new relationship between urban and rural areas. This new rural-urban balance can be achieved not only by the recognition of the important services that agro-ecosystems provide to cities, but also through the implementation of economic measures that encourage farmers to provide these services.

Catalogue of Green and Blue Services

The Netherlands have developed a Catalogue of Green and Blue Services because the National AES cannot easily be transformed to match with regional needs. In the Catalogue of Green and Blue Services the 'packages' are separated into clusters of 'activities' so that local and regional governments can more easily compose sets of measures that match with local circumstances.

Some characteristics of the Catalogue of Green and Blue Services:

- A national framework for the development of local or regional agri-environmental schemes.
- Local or regional governments are to design their own schemes on the basis of the Catalogue.
- Measures are geographically defined.
- Prices to be paid are specified at the activities level.
- Schemes based on the Catalogue do not need to pass the state aid procedure.
- The Catalogue is to be updated and re-assessed by the European Commission each year.

The development of Green and Blue Services and the Catalogue in the Netherlands is still a continuing process. They are considered as an important form of multifunctional farming and play a key role in the Netherlands agenda for the reform of the Common Agricultural Policy.



Advantages of Green and Blue Services

- Measures are generally developed with farmers and other local stakeholders, with the aim to match with the local needs:
- Initiatives include the possibility of private financial contributions.
- Services may generate an extra income for farmers.
- Farmers may generate an extra income from by-products:
 - E.g. mowing of reed, harvesting of duckweed.
- Services are more flexible than the packages in European and national schemes:
 - Those who ask for services small-sized and short-term services may benefit green blue services.
- Services go beyond Good Agricultural Practices and legal obligations.
- Services are private ¹⁾ and public ²⁾ demand driven:
 - ¹⁾ Other farmers (irrigation water), industries (process or cooling water), drinking water companies.
 - ²⁾ Raising groundwater levels to preserve nature areas or for recreational water facilities. Extra water storage capacity to decrease peak-flow discharges.
- Services go beyond compensating the costs and should be in compliance with regulations (state aid).
 - Aid of subsidized costs for agricultural enterprises are allowed up to € 7.500 over a period of 3 years.
- Funds are mostly originated and provided by lower administrative levels.
- Services could be an option when inundation occurs with a frequency between once every 5 years and once every 15 years and when the land price is high (decisions should be based on cost/benefit analyses).

Disadvantages of Green and Blue Services

- Small sized services:
 - Water management sometimes requires e.g. more land than one farmer can offer.
 - Collaboration between farmers is needed when more farmers are involved and market for by-products need to be found.
- Short-term services:
 - Farmers need long-term commitments to guarantee their income and they need sufficient income. This means sustained demand for services and structural funding.
- The organization is complex when the need for the storage area is less frequent than once every 15 years:
 - Contracts have to be made between water manager and farmer.
 - A monitoring system has to be set up.
- Services may be no option when the land price is low (decisions should be based on cost/benefit analyses):
 - Transaction and monitoring costs could be > land price.
- Dependent on the (political) will to pay for services:
 - There's not always enough (political) will to pay for services.
- European state aid limitations for governmental water managers are:
 - Compensation only for labour and real transaction (production loss/costs, plus 20% management fee) up to € 7.500 over a period of 3 years for agricultural enterprises.
 - It often comes to stacking functions, but stacking of fees/grants is not permitted.
 - Grant application process is complex and expensive.
- The quality of sustainable water management is difficult to value.
- Possibility that compensation of service conflicts with the state aid rules.
- Services are more related to nature and water quality than to water quantity.
- No compensation for maintenance, small plots, loss of income, decline in value of land, investments, 'results achieved'.

5.3.3 Capital Maintenance

A profit can be realized only after capital of the firm has either been restored to its original level (called 'capital recovery') or is maintained at a predetermined level. It is necessary, therefore, to determine the value of capital before the amount of profit can be computed.

(<http://www.businessdictionary.com/definition/capital-maintenance.html>)

For example, if farmland is needed for peak-flow storage to prevent flooding. The capital of the agricultural enterprises (production, land value, income, etc.) must be maintained (at the same level or more) in future to ensure a good life (security, health) and continuity of the economic system (farmers' income, economic system in the region).

Peak-flow storage on farmland is an economic output (valuable good/service) of agricultural enterprises. The economic value of peak-flow storage on farmland is determined by labour, produced capital (machinery, equipment) and environmental input (raw materials, land areas). The monetary value of the service (peak-flow storage on farmland) over time is estimated (on an annual basis?), calculated and once paid in advance.

Advantages of capital maintenance

- Long-term arrangement:
 - Guarantees farmers income
- Does not conflict with state aid rules when the usual method of valuation and calculation is used transparently.

Disadvantages of capital maintenance

- No normal market advantage.
- One-time payment of damages = damage compensation:
 - Inflation and a value decrease of farmland are not taken into account.
 - When regulated by law the farmer has no rights to claim compensation payments but in practice at least a part of the production losses is compensated.
- Linked to CAP funds:
 - Provided mostly by the European Union and the national government;
 - It is experienced as complicated and bureaucratic;
 - Private financial contributions are excluded.
- Packages in European/National schemes doesn't always match with local needs;
- Capital maintenance may be no option when the use is more frequent than once every 5 years (decisions should be based on cost/benefit analyses) :
 - In some occasions to buy land could be the best economic solution for water authorities.
 - In other situations, when land is scarce and the price high or maintenance costs are high, multiple land use (combination of farming and water storage) can be a better option.
- Capital maintenance is not at all times voluntary based, e.g. water conservation:
 - When based on legislation (regulated by law) that prescribes that the particular land has to be used for e.g. water storage since it has been assigned as e.g. retention area (spatial plans).
 - Not all farmers want their land to be flooded (it is not always compatible with the agricultural function) or farmers consider the payment too low (value of the land decreases). Land exchange between farmers can be an option.
 - Flooding means a high risk of long-term pollution (sedimentation of Heavy metals, Dioxin, Persistent Fluor, etc.).

5.3.4 Market oriented model

Market oriented activities are designed to lead to a more market oriented economy.

Market oriented economy, society, system, etc. is one with free markets where people can buy and sell freely and where most companies are not owned by the state.

A company that is market oriented tries to design and sell products that satisfy customers' needs (http://lexicon.ft.com/term.asp?t=market_oriented).

For example, the creation of new markets for measures that are ignored by traditional markets, or the design of funding mechanisms to encourage farmers to preserve the performance of ecological services in their own properties. They represent an alternative to classic-top-down, command-and-control policies, like standard (economic) regulations. The development of Nitrogen quotas, marketing of water rights, public tender are examples of a market oriented approach to sustainable water management.

In Denmark there is discussion about a Nitrogen quota system, an instrument for reducing N-leaching to surface water. The idea is inspired by the CO₂ quota system and linked to the Water Frame Directive goals that each water catchment has to reduce the input of Nitrogen leaching to watercourses. However, it is not yet decided to further develop the idea.

The cost of quota leads to an optimized allocation of the scarce factor. The costs also result in a "quota rent" for those who own it in the beginning (compare: milk quota).

<http://www.agriculturedictionary.com/definition/milk-quota.html>

Advantages of market oriented methods

- Independent from state aid, farmers are free to decide which services they want to sell and to whom and in what quantity.
- Reduced uncertainty and adjustment costs (e.g. marketable water rights):
 - There is the possibility of a unique price for services, determined by demand and supply and by competition between firms.
- Absence of erosion by inflation and economic growth (e.g. marketable water rights).
- Lack of additional cost to the polluters (e.g. marketable water rights).
- Competition between firms may lead to increased efficiency.
- There may be more innovation, e.g. cheaper ways to do their work.
- Investors could be attracted because of new opportunities to make money.
- Ease of administration (e.g. marketable water rights):
 - Bureaucracy can be reduced as various activities are taken over by private enterprises.

Disadvantages of market oriented methods

- Distorted investment priorities, as maximizing profit rather than satisfying agri-environmental needs is the aim.
- Growing social and economic inequality (distort competition) by preferential treatment to certain firms and regions or favouring certain services.
- Transaction costs (e.g. marketable water rights).
- Lack of revenues to the government (e.g. marketable water rights):
- For business investments you need to specify the benefits, like water quality:
 - The quality of sustainable water management is difficult to value.
- For (N-) quota's it is difficult to set one price, because:
 - Who is going to pay?
 - Are there enough people to trade N-Quota's in relatively small catchments?

5.3.5 (Social) Insurance model

Insurance is a form of risk management primarily used to hedge against the risk of an uncertain loss. Insurance is generally defined as the equitable transfer of the risk of a loss, from one entity to another, in exchange for payment.

This concept is one of several potential financial methods being explored in Scotland, where the focus is on costs/benefits ratios and whether there may be a case for an insurance based payment scheme to compensate farmers rather than a public finance option. The concept is very much in early stages and no precedents/experience has as yet been identified.



In Niedersachsen farmers have been paid for a first time forestation of arable land as a 10-year-pension.

Advantages of the insurance model

- Payout to farmer/water manager only where loss has actually occurred.
- Rates can be negotiated to suit individual situation.
- Could be attractive to farmers as long as compensation rates are set favourably.

Disadvantages of the insurance model

- No normal market advantage.
- Cost/benefit ratio complex.
- Long-term uncertainties.
- Insurer may face substantial variations in costs from year to year – budgeting may be difficult.
- Water management could be perceived as a 'risk only' activity which requires compensation, rather than a positive activity with benefits.

5.3.6 Other (financial) methods

Other options to get farmers and water authorities willing to provide a service that prevent flooding, water shortages or leaching of nutrients are:

- Tax on fertilizer, as used in Sweden for some decades to combat nutrient pollution.
- Nitrogen discharge tax, that is investigated by Sweden to lower the pollution.
- Developing knowledge:
 - production processes for by-products;
 - local possibilities for green blue services (manual);
 - Economic valuation of the quality of sustainable water management (figures);
 - Farmers' interest and local needs.
- Time is needed to build up trust. You should start small with quick results and then move on to other things. Waiting for money and agreement from Brussels is usually too long.
- Putting together voluntary packages of measures or join existing packages of measures.
- Restore the connection with farmers:
 - Water coordinator/advisor (mediator) develops a plan with a farmer or a group of farmers and advises on the service package;
 - Make use of the entrepreneurship of farmers and their expertise.
- Create possibilities for innovations:
 - Create water recharge area in spatial planning;
 - Ecolabelling of services;
 - International Cittaslow accreditation.
- Another possibility is to link water management objectives to tourism investments. Sparsely populated areas are often attractive for tourists.
- The tax payer/people from the area (society) needs to get involved, they will get the politician interested. Use the media, show concrete results.
- Support farmers in organizing themselves:
 - Collaboration agencies (joined-up strategies).
- Simplification of procedures/support schemes.
- A locally-based integrated funding mechanism.
- Make differences in quality of services.

5.4 External financial resources

A successful implementation of a financial method or water management measure depends also on the availability of alternative sources of funding to replace money from the EU budget. Different alternative sources of funding can be distinguished:

- Funding of large capital for major investments, which is mainly found within the private sector e.g. international and private financing institutions:
 - private sector investments.
 - sustainable financing = combination of private sector investments and private sector payments for efficient operations, maintenance, modernisation and expansion.
- Public fund, e.g. Green fund Midden-Delfland:
 - Public money.
 - Point system for green services, farmers get points for services that can be converted to money.
 - Farmers get reimbursed.
 - Green fund passed the state aid test.
- The concept of a Bank for water authorities as participants/shareholders, e.g. Nederlandse Waterschapsbank.
- Legislation of water authorities to raise money (charge and levy) and taxation of the people in the jurisdiction area of the water authority for generating income systematically.



6 CONCLUSIONS

The aim of the Aquarius project is to share expertise and experiences that can be used in the pilot regions. The results provide new insights that can be relevant for various partners in the pilot regions. It helps them strengthen and improve their knowledge in making decisions.

All Aquarius partners agreed that we need farmers to act as water managers to achieve water management goals and to face changing climatic conditions. Successful water management through engaging with farmers depends on different factors, including the economic conditions.

6.1 Farmers' interest

It is important that there is a good cooperation between farmers and other partners in the region and therefore it is necessary to seek for win-win situations. Water authorities or other water partners have to fulfil the increased public and private demand for water (water storage, drinking water, irrigation water, recreational water, clean water, etc.). Farmers on the other hand need sufficient income to face the consequences of the new CAP: decoupling of subsidies and production to make farmers more competitive and market oriented.

What water management tasks can be performed by farmers depend on the farmers' interest. Farmers are interested when it is profitable for them. This concerns not only a sufficient and stable income, but also non-financial profits such as enough water of good quality for irrigation, protection against damage (insects), production of by-products (reed, grass), etc.

What water management tasks can be performed by farmers also depend on the characteristics of an area. Who is responsible for water management, which water management problem need to be solved, what are the possibilities (e.g. space, land price) to solve the problem? The answers on these questions determine the design of a water management measure, such as the flexibility, size or type of measure.

6.2 Barriers for "farmers as water managers"

All EU member States are obliged to develop Agri-environmental schemes (AES) as part of their rural development policies. These schemes consist basically a set of measures designed at national or regional level to encourage farmers to protect, enhance and maintain the environment on their farmland. These measures go beyond statutory environmental requirements, defined in the Good Farming Practice codes. However, the Aquarius partners experiences some barriers here:

- Funds for environmental issues in agriculture are linked to CAP, but there seems no synergy with environmental issues in other EU policies.
- Funds are provided by the European Union and the national government and can be seen as a purely public system of payments. However, more possibilities are needed to originate funds at lower administrative levels and to include private funding.
- The 'packages' of measures in agri-environmental schemes are "standards" and apply to selected (high sensitive) areas. However, it is important that measures and schemes match with the local landscape, ecology and local needs to protect and enhance the (aquatic) environment.

There can be an overlap between Cross Compliance and AES. This means that the reference point: dividing line between environmental costs (Cross Compliance standards) and environmental benefits (AES) related to agricultural practices, is not always clear. Some of the Cross Compliance standards (placed on the costs side) may result in improvements to the environmental impact of agriculture compared to the present situation and will therefore belong to the benefit side of the reference point. For example: agri-environmental measures are used to bring agricultural practices in line with some of the requirements of the Nitrates Directive or more or less similar requirements are used in both Cross Compliance and AES.

The barrier Aquarius partners experiences is:

There are environmental costs and benefits in agriculture. This cost-benefit relationship has to be taken into account in the assessment of ecosystem services to maintain, protect and restore the (aquatic) environment.

Government aid is controlled by the European Commission's state aid test. This means that state aid to a large number of aid measures, whether direct (grants) or indirect (e.g. measures that ease the financial burden on a company) and regardless of their basis or purpose, are prohibited. However, an absolute ban on state aid is impossible, and the treaty provides for a number of exemptions for aid that are compatible with the Common Market and for aid that may be compatible under certain conditions. The European Commission drafted guidelines and frameworks, clarifying the conditions under which state aid may be granted.

Barriers Aquarius partners experiences are:

- The exemptions of state aid for agricultural enterprises are limited, meaning that the maximum payment is low compared to the market price. Payments are either given as income forgone compensations or as payments for costs incurred. An additional small extra 'incentive' amount is allowed.
- Farmers cannot receive a market price for their water management services, as state aid control prevent a commercial approach to water management tasks in agriculture. It is not much attractive to farmers to act as water managers if they cannot receive a fair (market) price for their services.

The European Community requires state aid to be notified to the European Commission so that it can assess whether the aid is compatible with the Common Market. Certain categories of aid can be exempted from the notification requirement. However, Aquarius partners experiences a barrier when the aid measure has to be reported to the European Commission:

- The state aid procedure is very complex, time consuming and expensive.

The European Commission stimulates EU Member States to draw up a Catalogue of Green and Blue Services that include measures that have been approved by the European Commission and do not need to pass the state aid procedure. Aquarius partners experiences some barriers with the National Catalogue of Green and Blue Services:

- The Catalogue doesn't solve the problem of relatively low grants for services.
- The Catalogue contains small sized measures only.
- The Catalogue does not contain much water-related (blue) measures.
- Water quantity measures, such as flood areas, are missing.

The use of agricultural land in the Netherlands is often regulated by law or designated as flood areas in spatial plans: the government poses the right to use the land as a retention area in case of extreme flooding. Theoretically, the farmer doesn't have the right to claim compensation payments for the production losses, but in practice the losses are in most cases (in part) compensated for.



6.3 Solutions for “farmers as water managers”

To resolve the barriers for farmers to act as water managers the Aquarius partners discussed the following solutions:

More synergy between CAP and Environmental policies:

- CAP grants revoked can be used to encourage farmers to protect, enhance and maintain the environment.
- Higher state aid upper limit for agricultural enterprises

More synergy between Cross Compliance and AES:

- Less overlap between Cross Compliance and AES.
- In the assessment of measures the cost-benefit relationship in agriculture has to be taken into account.

The AES and the Catalogue of Green and Blue Services should match with the local characteristics and farmers’ interest:

- The AES need to be flexible enough for local interpretation and application.
- Local interests must be noticed and supported by national and regional water authorities.
- Long term contracts (> 5 year) are required, but should not restrict the farmers’ flexibility too much.
- More water-related and water quality measures need to be included.
- It is plead for to include also water quantity measures (high water level control and occasional flooding), measures to protect drinking water and measures related to organic farming.
- More possibilities are needed to originate funds at lower administrative levels, including private funding.

It is discussed that payments should be more incentive and fair. Farmers are needed to act as water managers to reach goals, therefore it should be paid for. It should be possible for farmers to make a profit out of it so that it become a commercially interesting activity for them:

- Compensation payments should be calculated not only for production loss/costs but also for e.g. maintenance, small plots, loss of income, decline in value of land, investments, ‘results achieved’, etc.
- A way to avoid illegal aid is to invite public tenders for water management measures. It will make the service available to more parties than only agricultural enterprises and will ensure a true market price and fair competition. It seems even possible to tender the result, like a certain amount of water storage capacity for flood control.

The focus on government subsidies only will not be sufficient to resolve the barriers for farmers to act as water managers. Private investment is necessary, which in turn will also generate government money. However, the Aquarius partners agree that it should be noted that:

- The market is not perfect, making government involvement necessary.
- Market driven demand is more difficult for small or sparsely populated areas.
- A combination of private money and government subsidies may be necessary to keep the farmers as food producers and as landscape and water managers in the area.

In the pilot regions other options to resolve barriers for farmers to act as water managers are explored and discussed in the Aquarius project.

- In the Scottish pilot region (Tarland) the concept of a (social) insurance model is being explored, where the focus is on costs/benefits ratios and whether there may be a case for an insurance based payment scheme to compensate farmers rather than a public finance option. But the concept is very much in early stages and no precedents/experience has as yet been identified.
- In Denmark a Green Growth Agreement has been studied on how “nitrogen quota’s” could be handled through an integrated advice where a catalogue of different measures for reducing N and P are to be used depending on what farm and what catchment they face. However, it is not

yet decided to further develop the idea, because there are some questions concerning price setting that need to be answered first.

- Sometimes a financial method or water management measure cannot be implemented due to difficulties in finding an alternative source of funding to replace money from the EU budget. However, there are some experiences in the pilot regions with private and public funding (e.g. Green fund Midden-Delfland), but the results were no part of discussion.

Besides financial methods also non-financial methods are considered to be options for farmers to act as sustainable water managers. Most of the non-financial solutions were about local needs, knowledge/innovation, trust and bottom-up/participatory approaches.

Although the Aquarius partners shared a lot of their knowledge and experiences on financial methods, still a lot of questions remain to be discussed in the pilot region itself or in (trans-) national networks of experts and government officials. Some of them are:

- What water management problems need to be solved?
- Who is responsible?
- Who takes the lead?
- Who pays?
- Who are involved?
- What are the farmers' interests/local needs?
- Who has the authority to keep the quality of services to a fixed standard (control, monitoring)?
- How to deal with uncertainties (income, risks)?
- How to calculate the benefits in cost-benefit-analysis (for example at rain harvesting)?
- How is congruence achieved between bearers of cost and receivers of benefits?
- Is it acceptable that payment levels may differ per area?



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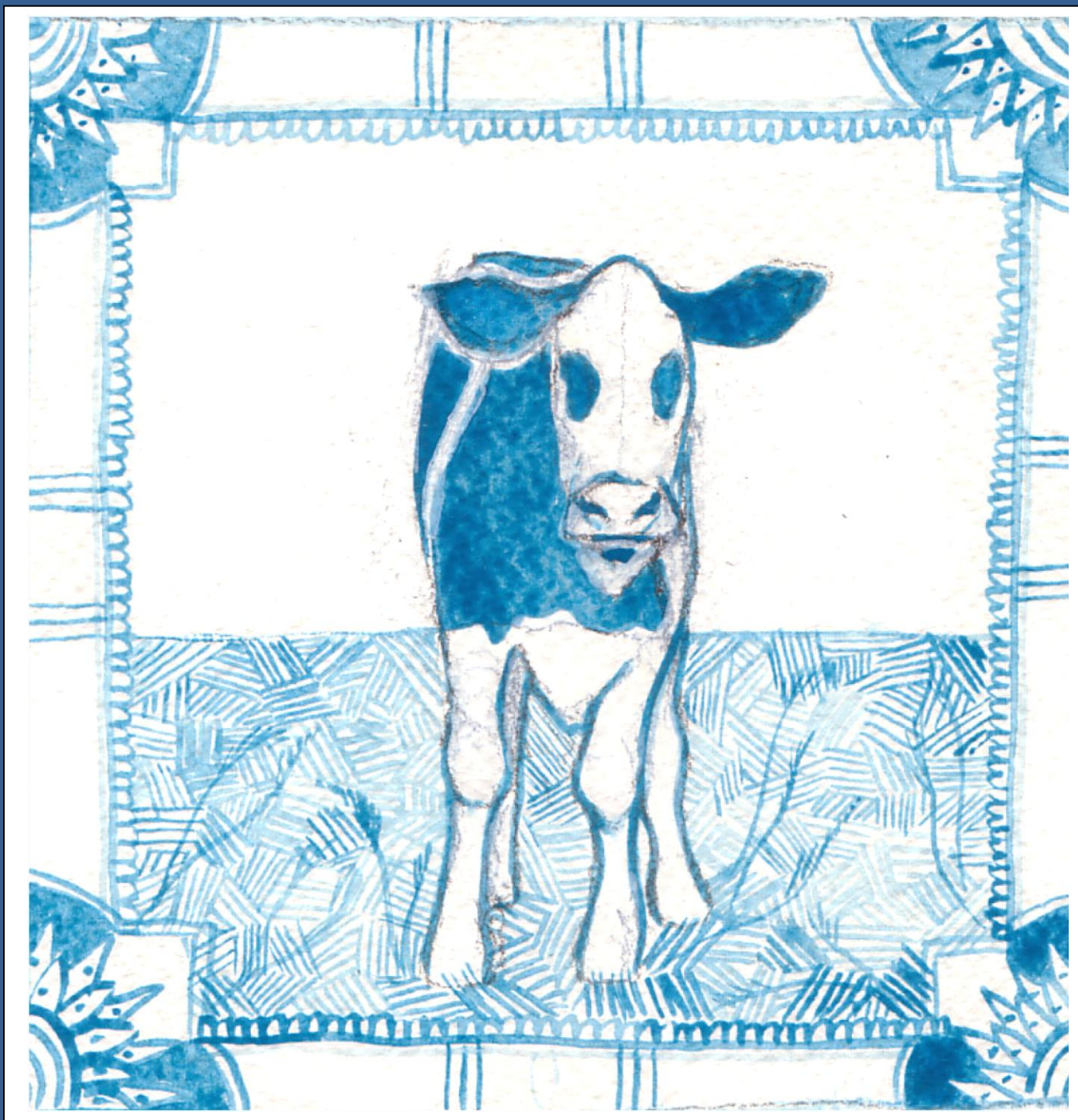
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