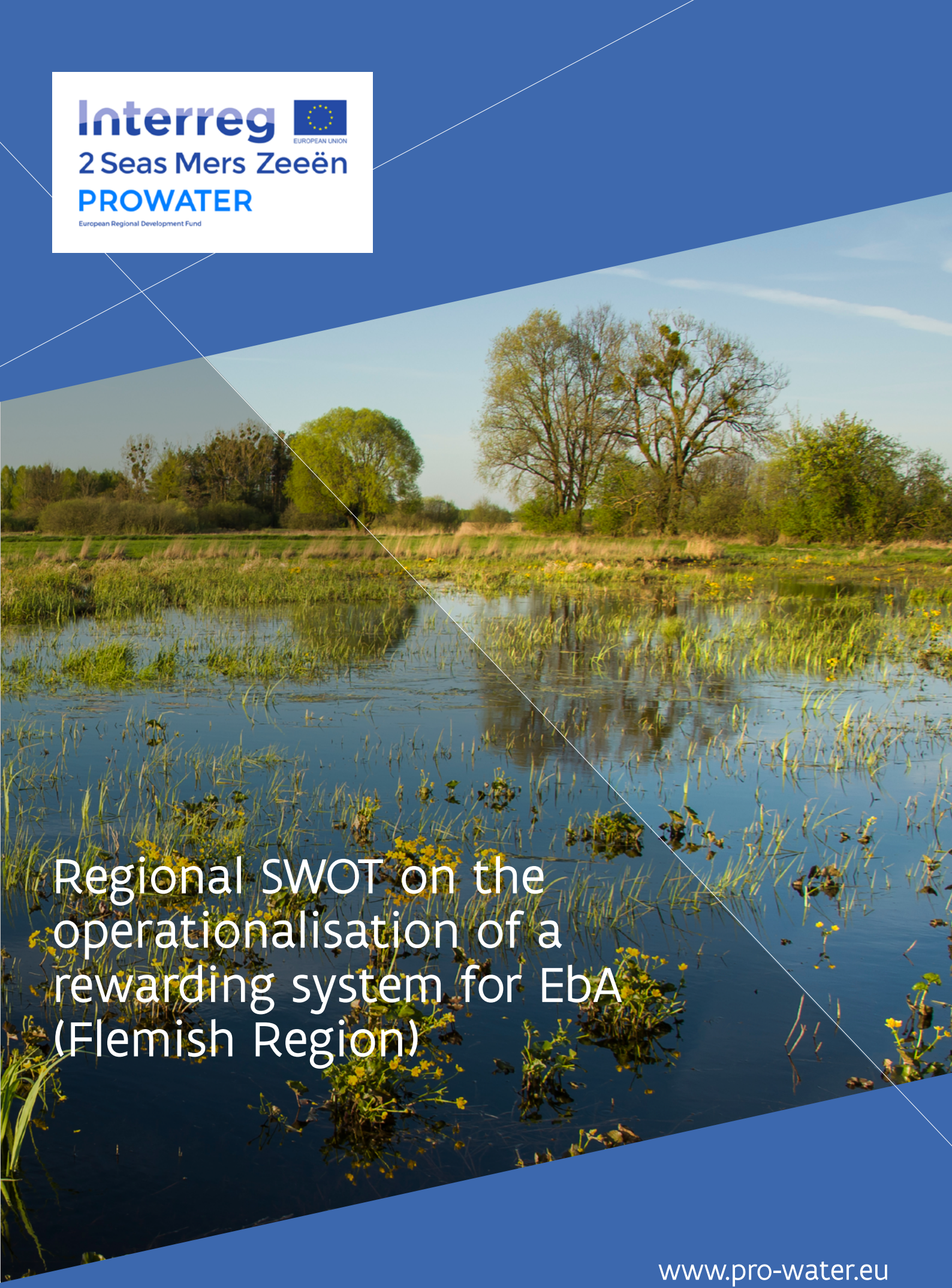
Interreg
EUROPEAN UNION
2 Seas Mers Zeeën
PROWATER
European Regional Development Fund



Regional SWOT on the operationalisation of a rewarding system for EbA (Flemish Region)

www.pro-water.eu

DISCLAIMER

COLOFON

The PROWATER project has received funding from the Interreg 2 Seas programme 2014-2020 co-funded by the European Regional Development Fund under subsidy contract No 2S04-027. Interreg 2 seas is a European territorial cooperation program for the United Kingdom, France, the Netherlands and Belgium (Flanders).

Citation: A. Boerema and J. Staes (2019). Regional SWOT on the operationalisation of a rewarding system for EbA (Flemish Region). Interreg 2 Seas programme 2014-2020 No 2S04-027. ECOBE-Report 019-R235. Antwerp, University of Antwerp.
ECOBE-Report 019-R235

AUTHORS

Dr. Annelies Boerema
Dr. Jan Staes
University of Antwerp
Ecosystem Management Research Group (ECOBE)
Universiteitsplein 1 C, 2610 Wilrijk, Belgium
www.uantwerpen.be/en/research-groups/ecobe/

PARTNERS

Flanders State of the Art
Universiteit Antwerpen
Provincie Antwerpen
pidpa water in beweging
Westcountry Rivers Trust
Kent County Council kent.gov.uk
south east water
Waterschap Brabantse Delta
natuurpunt
south east rivers trust

Content

1 Introduction

1.1 PROWATER project

PROWATER (Protecting and Restoring Raw Water Sources through Actions at the Landscape Scale) is an Interreg 2 Seas project running from 2018-2022 with partners from Belgium, Netherlands, United Kingdom and France (observers).

The overall objective of the project is to build resilience against droughts (and extreme precipitation events) through Ecosystem Based Adaptation measures (interventions that work with natural processes).

Climate and Land Use Change are increasing pressures on water resources. Changing rainfall patterns, alongside intensification of agriculture (often resulting in increased input of fertilizers and pesticides and machinery) and urbanisation (with increased surface sealing and urban pollution) impact water quality as well as water quantity not only in the environment but also for human consumption. Increasing resilience of catchments to the combined effects of these pressures necessitates different actors to work together to address these challenges and implement ecosystem-based adaptation. One approach is through the use of rewarding mechanisms in the form of Payments for Ecosystem Services (PES) schemes, which can bring together those benefitting from adaptation measures and those delivering them through (financial) incentives that create benefit for both stakeholders.

A key objective of the project is therefore to develop and implement a PES model that facilitates the implementation of Ecosystem Based Adaptation (EbA) measures. The project will develop tools to target the implementation of EbA measures and aims to identify, quantify and demonstrate additional benefits of the EbA measures in order to recognise the full spectrum of benefits and provide additional leverage and funding for implementation.

1.2 Regional context

Flanders is internationally labelled as a risk area for water scarcity. Water shortages have already occurred in the summers of 2003, 2006, 2011, 2015, 2017 and 2018. Each of these drought episodes has had serious economic and ecologic impacts. The Flemish fresh water availability starts to be critical, since water supply from groundwater is at its limits. Of the 42 groundwater reservoirs, eight have too low water levels. Flanders implemented a number of measures for groundwater restoration at the request of Europe, but the Court calculated that these measures have many shortcomings (Rekenhof 2014).
Groundwater in the Campine Region is Flanders most important buffer to overcome water shortages. Because of the sandy soils and the large area of forest and nature, the groundwater reservoir is large and of good quality. In the Campine Ecoregion, about 13% of the long-term annual precipitation surplus (1,340 m^3) is annually extracted (175 mio m^3). If the groundwater reserves are sufficiently replenished, a drought period can be bridged by an increased supply of groundwater. But there, too, the shoe pinches. The replenishment of these groundwater reserves is insufficient because we have changed our landscapes. This poses a number of important challenges in terms of water supply. A

summer precipitation deficit has a double effect because it is at this point that the demand for water is highest. During a heat wave, drinking water consumption can increase rapidly and many farmers irrigate their crops. However, the extraction of groundwater to meet these needs is not without consequences. This extraction leads to declining phreatic groundwater levels and hence impacts nature, agriculture and forestry. About 80% of all Habitats Directive areas in Flanders are located in the Campine Ecoregion and many of them are groundwater dependent ecosystems. A conflict between water provisioning and biodiversity conservation is emerging. After all, many water production centers are located in or near NATURA 2000 sites and recent re-licensing of abstractions is already accompanied by lawsuits against the water companies.

How much infiltration capacity has been lost so far? The mean precipitation (1911-2011) for the Flemish Region is 816 mm/year with a standard deviation of 125 mm. Potential infiltration is limited by soil texture and groundwater depth. The groundwater depth has a limited effect and is an intermediate result of the water retention calculation method. The maximum infiltration can range up to 450 mm/year for sandy soils. Beside a potential infiltration, we assessed land-use related limiting factors for infiltration. More important variables are interception by vegetation and runoff from paved surface to storm drain infrastructure. Both parameters were mapped at high resolution (5 m pixels), using detailed data on vegetation, paved surface and sewage infrastructure (Figure 1). The total loss of infiltration capacity by both canopy interception and runoff from paved surfaces (difference between actual and potential infiltration) sums up to about 56 mio m³ which corresponds with about 4.3 % of the potential infiltration. This number is probably an underestimation because run-off from agricultural fields has not been accounted in this assessment. We expect that the infiltration capacity has been affected by the many years of cultivation of agricultural land with ever heavier machines. On many fields, a tillage pan has developed at 30-50 cm below ground level. This slowly permeable layer decreases the potential for deep infiltration. Moreover, the layer above the tillage pan is not deep enough to buffer a period of extreme precipitation, resulting in run-off from the fields.

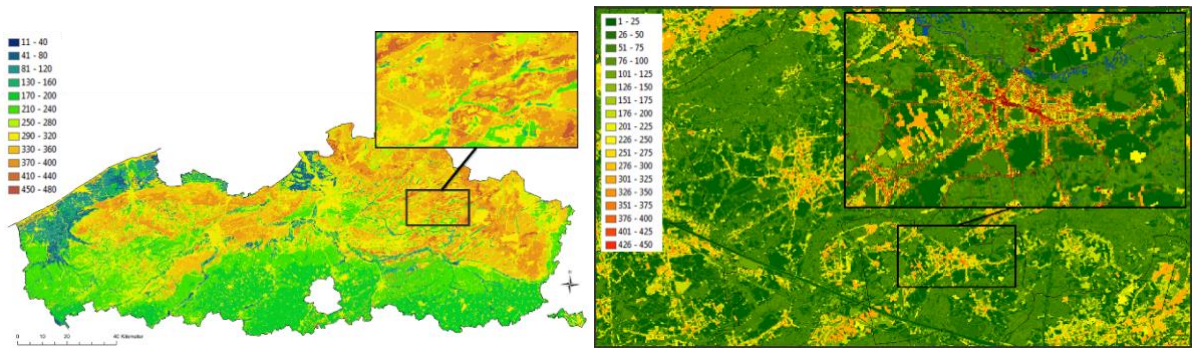


Figure 1. Left Potential mean annual infiltration, right: infiltration losses due to interception and run-off (mm/year).

Another important issue that affects groundwater recharge is drainage. Research conducted by the Institute for Nature and Forest Research (INBO) and the University of Antwerp (UA) in 2016 has already shown that in the last 50-60 years around 75% of all wetlands in Flanders have been lost. Such a loss is not without consequences for water management. The study also showed that 75% of the upstream "temporary" marshes have disappeared (fens and headwater wetlands). The formation of a temporary wetland on a less permeable layer in the soil is a natural process. Today, the shallow ground water is drained too quickly, so that it does not have the opportunity to infiltrate deeply. If we no longer (or

would no longer) drain such landscape depressions, we will still give the precipitation water the chance to slowly infiltrate the subsoil. But we did the opposite. There is hardly any landscape depression left that is not drained. Based on the intensity of the land use and the presence of drainage ditches, we can assume that on the scale of Flanders, roughly 120 million cubic metres of shallow soil water is discharged prematurely.

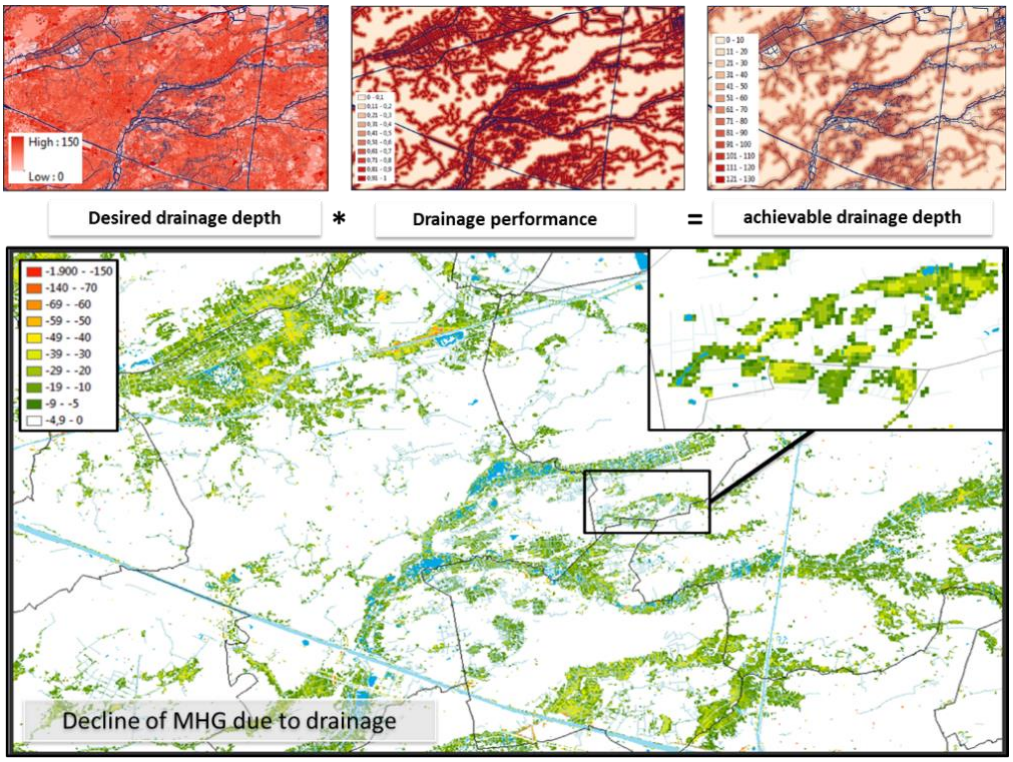


Figure 2. Drainage of shallow soil water due to drainage and land-use intensification

After the drought of 2018, many initiatives have been taken to overcome future drought episodes. Most of these initiatives focus on technical solutions. Examples are: 1) a better water distribution between regions and the development of a plan to prioritize water users and reduce water consumption 2) initiatives for the reuse of waste water from treatment plants and industry and 3) building water reservoirs for irrigation.

Although these measures have benefits in terms of demand management, there is a risk of investing in a number of technical and expensive measures for which it is difficult to decide when to use them. It is not possible to predict how long a drought will last. Water saving measures may be regretted if the drought does not continue, but in fact one should always be prepared for the scenario of a prolonged drought.

In general, nobody can regret an active policy to restore water reserves as quickly as possible. These are structural, future-oriented and sustainable investments. It will be necessary to make better use of periods of surplus precipitation in order to bridge periods of shortage. This is only possible if we increase both infiltration and retention in the upstream areas. We are already experiencing longer periods of both extremely wet and extremely dry weather. If we are to tackle both flooding and water shortages, we need to restore our landscapes to their hydrological functions.

In any case, there must be source-oriented solutions. If we do not succeed in replenishing groundwater resources, there will be not only direct economic damage, but also a huge loss of biodiversity and

ecosystem services. Hence, we will thus come into conflict with our international commitments to the preservation of biodiversity. Groundwater-dependent ecosystems, are at risk of becoming the victims of drought. By investing in groundwater replenishment, we also ensure a more stable groundwater supply to our most vulnerable nature reserves. If the restoration of infiltration and retention contributes significantly to groundwater recharge, the looming conflict between water abstraction and biodiversity conservation can be developed into a collaborative situation. There are some nice examples of partnerships between the water sector and the nature sector. The initiative 'Upstream Thinking' (http://www.upstreamthinking.org/) of South West Water can be inspiring. Through a partnership with farmers, nature and environmental organizations, the water companies support the restoration of upstream ecosystems to protect the quality and quantity of the raw water resources. There are also several examples where large industrial water consumers (e.g. Heineken, Bionade, Coca-Cola, Vittel) have set-up programmes to protect and restore their raw water resources.

There is currently much attention for drought and new policy initiatives are being developed. Measures could, for example, be funded and implemented in the Program for Rural Development (PDPO IV, 2020-2026). Drinking water companies can also contract farmers to implement measures without causing state aid issues. The resources of the existing groundwater levy (7.5 cent/m^3) could be used to finance initiatives that benefit groundwater quality and quantity. At the level of Flanders, the levy raises an annual budget of 22 mio €, which can potentially be used to finance EbA measures.

Provided water is crucial as a motor for biodiversity, growth, public health, well-being and for the economy, the implementation of EbA measures is of strategic importance to the Flemish Region. Restoring or developing ecosystems in places with exceptional hydro-geological and topographic conditions can have an important water regulation effects and thus guarantee and strengthen the water supply from groundwater. The Strategic Flemish Policy Plan for Spatial Planning was approved on the 20th of July 2018 and has much attention for water and climate change. Strategic objective 6 deals with creating robust water resilient landscapes (Departement Omgeving 2018), which directly aligns with PROWATER. The PROWATER outputs can facilitate the transformation of this strategic plan into an operational plan to make Flanders a more water resilient region.

1.3 Payments for EbA measures (PEbA)

Ecosystem based Adaptation (EbA) measures are needed to increase the resilience to droughts. Beside the objectives that are considered from a climate adaptation perspective, there can be many more ecosystem services delivered by implementing EbA measures. These additional benefits can increase societal support and provide leverage to implement the EbA measures.

Water is supplied by the land in upstream catchments and the management of that land affects the magnitude and timing of water flows. By promoting upstream infiltration and retention, a significant buffer could be created to overcome droughts. But land owners are often unaware that their land use practices affect the quantity and quality of water flows. Land-owners should be encouraged to implement EbA measures. This can be resolved partly through sensibilisation, but many private landowners will not be sensitive to these societal benefits. The beneficiaries of such measures are downstream water producers and communities, and therefore land-owners and managers have no real incentive to promote infiltration and retention. A first step is to lower the threshold by supporting

land-owners through area-specific programs in which the EbA measures are implemented by professionals at low cost (e.g. placing adjustable weirs on drainage systems).

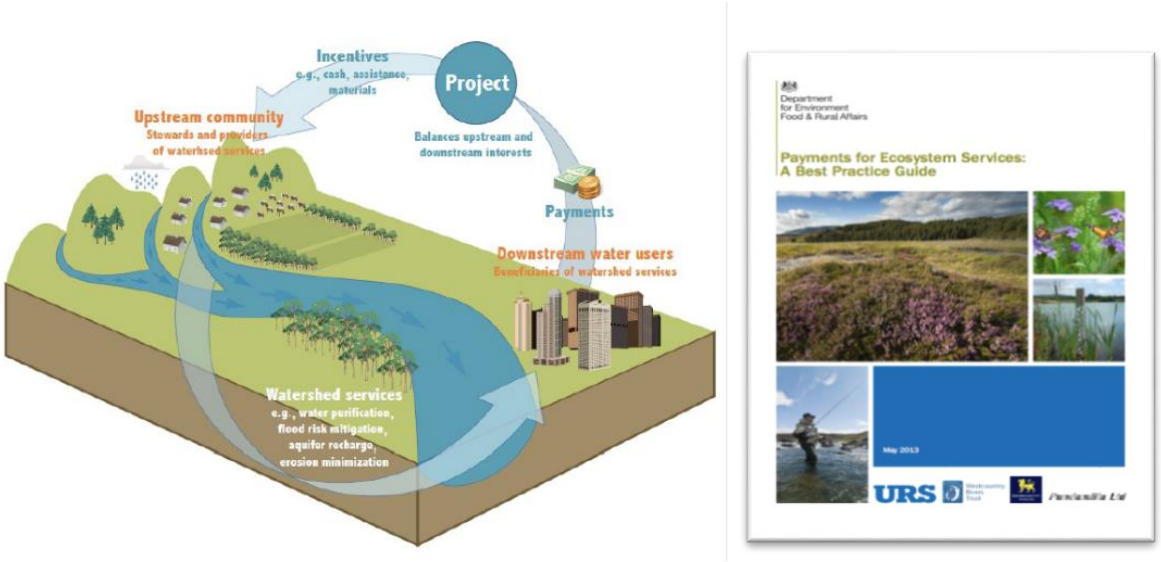


Figure 3: Investigating novel funding mechanisms for small scale adaptation measures. Westcountry Rivers Trust has developed methods to quantify ES related to water quality improvement through the Upstream Thinking project.

A financial reward for EbA may trigger a lot of land-users/owners towards implementation. But the incentive should be substantial enough. Most existing subsidies only cover the profit forgone, resulting in a relatively low implementation rate. Such subsidies only reach land-owners that have an intrinsic motivation (altruistic), enabling them to implement measures at lower cost. Many land-owners can only be triggered to implementation when there is a secured financial advantage.

It might be smart and cost-effective to offer land-owners a profit model for implementing EbA-measures. The Flemish Region invests a lot in technical measures and infrastructure to reduce flood risk and achieve water quality standards. What if these EbA measures can deliver the same results at lower costs? The rewarding mechanism for changes in land management should not be based on profit forgone, but should look at saved expenses (shadow prices) and wider societal benefits (ecosystem services) (Figure 3).

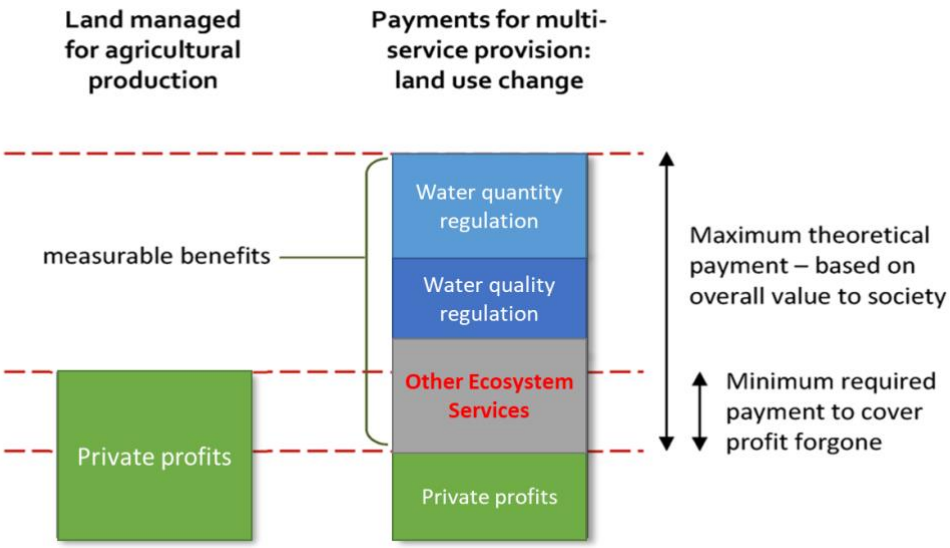


Figure 4: Minimum and maximum payments for EbA measures.

But this also doesn't mean that we should reward all practices that have positive effects on hydrological resilience. Therefore we apply a pyramid (Figure 4). Some practices/measures are already obliged by law. But in most cases new laws and obligations are not retroactive and thus only apply to new permits. This means that the impact of new regulations can be very slow. Also there is a huge potential to implement measures that may be beneficial for land-owners and/or have no particular negative impacts on land-owners. A good example may be the remediation of soil compaction and improvement of soil quality in general.

The next level(s) of the pyramid can be categorised as PES. Within PROWATER, we are looking at those EbA measures that have high societal benefits, but are not yet promoted through financial or practical support for land-owners. There are also existing instruments that are voluntary and partly subsidised. The current instruments that target environmental quality are mostly limited to covering the cost for implementation and/or the profit forgone. Also these instruments reach only those land-owners that already have a high awareness on the climate/environment challenges. Complementary to these financial compensations, organisations can also facilitate/enable the implementation of measures. Financial rewards that exceed the profit forgone can conflict with state-aid regulations. Therefore it is also important to lower the barrier to implementation by lowering the administrative and logistical burden.

But in order to achieve climate resilient landscapes, there is a need to reach also those land-owners that do not (yet) care about climate and environment. Quite often, these land-owners really need their land to make a living and do not have the time or means to take action. These landowners may be driven by market trends, long-term contracts and pressures towards scale enlargement and intensification. Awareness raising on the climate and environment challenge will not suffice, there is need to offer these land-owners a profit model.

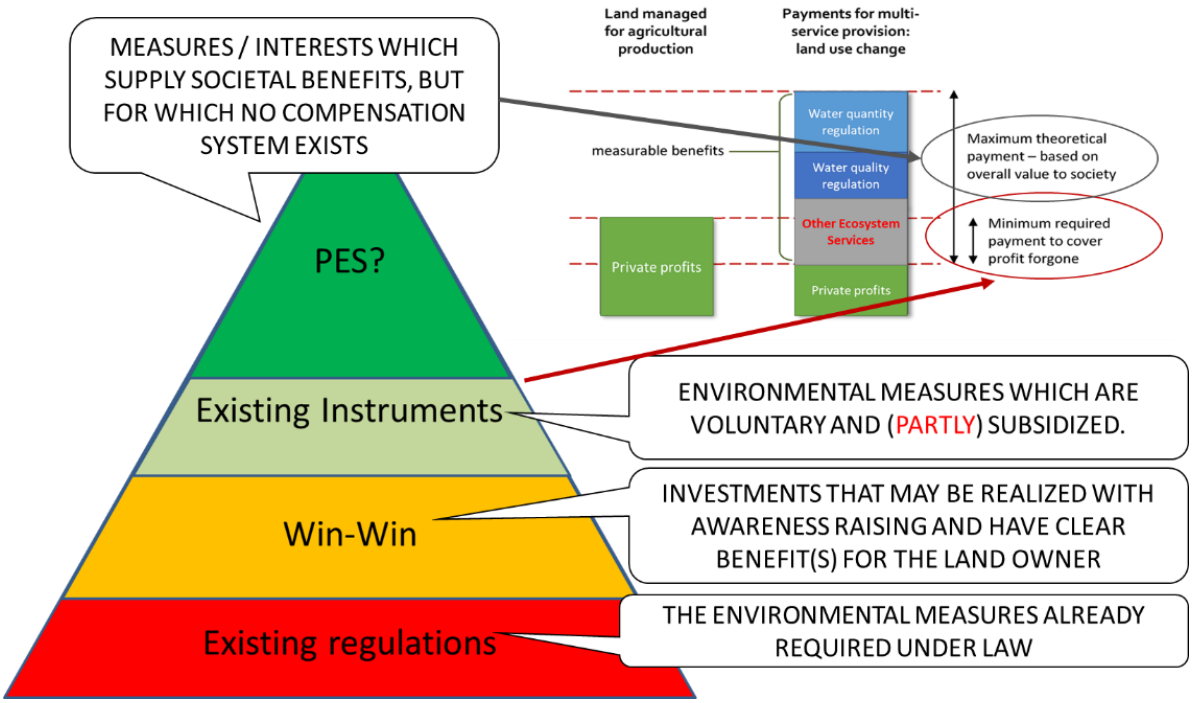


Figure 5: A PES-pyramid schematically represents the position of PES in relation to existing regulations, subsidies and awareness raising initiatives

But PES-schemes can also be disruptive and have unintentional side-effects. The design of an effective PES scheme requires a lot of consideration, including political, financial, juridical and organisational aspects. There is need for a fast and flexible rewarding system with low administrative burdens. The rewarding mechanism for changes in land management should be based on a) the expected impact on hydrological resilience (core funding by water sector) and b) The societal co-benefits (additional funding from other sectors/policy domains). The main objective of the project is to pave the way to an actual an operational rewarding/funding scheme for the implementation of EbA measures that increase the hydrological resilience to droughts. This report will look at the Payment for Ecosystem Services (PES) system for EbA measures (PEbA) from the perspective of BUYERS and BROKERS, focussing on the political, financial, juridical and organisational aspects. In conclusion, this SWOT report aims to contribute to resolving the WHY and HOW of setting up a PEbA scheme by identifying the strengths, weaknesses, opportunities and threats.

1.4 The PES concept

In the field of environmental conservation, the ecosystem services concept has gained substantial assent within a broad community of scientist, politicians and different societal organizations. The Millennium Ecosystem Assessment (MEA) in 2005 strongly influenced the increasing recognition of ecosystems as potential providers of services essential for human well-being (MEA 2005).

Unsurprisingly, there have been several attempts to develop policy instruments that aim to account for the economic value of ecosystems and the services they provide. Payment or compensation for

Ecosystem Services have evolved as a promising policy instrument to improve environmental conservation based on the valuation of ecosystem services (Mayrand and Paquin 2004).

Payments for ecosystem services (**PES**), also known as **payments for environmental services** (or **benefits**), are incentives offered to farmers or landowners in exchange for managing their land to provide some sort of ecological service. They have been defined as "a transparent system for the additional provision of environmental services through conditional payments to voluntary providers".

The watershed PES sector is the most mature in terms of transaction value and geographical distribution (US$24.7 billion in 62 countries in 2015). There are currently 387 watershed PES programmes: 153 user-financed, 203 government-financed and 31 compliance. (Salzman et al. 2018)
Payments for Ecosystem Services (PES) represent a promising instrument that combines several of the desired instrument properties. Over the last two decades, PES has become a popular instrument to complement protected areas and other regulatory approaches in ecosystem conservation policy. Especially in the context of watershed protection, several attempts have been made on different policy levels to achieve this goal through Payments for Hydrological Ecosystem Services (PHES).

Economic instruments, such as environmental taxes, charges and fees, put a price on environmentally damaging behaviour, thus internalizing negative externalities, whereas payments for environmental services and ecological fiscal transfers reward conservation enhancing behaviour, thereby addressing positive externalities (Hack 2013).
Some PES programs involve contracts between consumers of ecosystem services and the suppliers of these services. However, most of the PES programs are funded by governments and involve intermediaries, such as non-government organisations. The party supplying the environmental services normally holds the property rights over an environmental good that provides a flow of benefits to the demanding party in return for compensation. In the case of private contracts, the beneficiaries of the ecosystem services are willing to pay a price that can be expected to be lower than their welfare gain due to the services. The providers of the ecosystem services can be expected to be willing to accept a payment that is greater than the cost of providing the services.
Both conceptual and practical challenges remain. The geographic system may not align with the institutional boundaries (e.g. when upstream rivers are located in other countries). There are also issues when the measures themselves fall under jurisdiction of other institutions.

2 Methodology

2.1 Context of the SWOT analysis in PROWATER

A final objective of the project is to pave the way to an actual and operational rewarding/funding scheme for the implementation of EbA measures that increase the hydrological resilience to droughts. We follow a methodic procedure, by starting with making a SWOT analysis of such a PEbA rewarding/funding scheme.

Therefore, a series of workshops are foreseen in WP1 to make an inventory of potential strengths, weaknesses, opportunities and threats. In these workshops we will discuss the need and desirability of PES-schemes from different perspectives. A stakeholder mapping workshop will identify the potential buyers, sellers and brokers. This will be done for each region, followed by an international workshop to synthesize common findings and challenges. At the end of the project we will propose well elaborated PES-schemes, including policy recommendations for implementation. The WP1 workshops not only identify the SWOT but are also a starting point for the rest of the project. The workshops also identify key target groups and key topics for the follow-up workshops in WP3. The workshops are indeed continued in WP3, where we first discuss on how big the challenge is for water security and what can potentially be achieved through EbA-measures. Next, a long-term spatial vision is developed on setting priorities for EbA. This vision building is also created through a participatory process with stakeholders.

WP1 will look at this challenge from the perspective of policy and will bring together buyers and brokers to identify, discus and resolve the institutional, juridical, political and ethical issues that may be associated with PEbA schemes. WP1 targets the key-challenges from an institutional and organizational point of view. Each region will organize 4 **workshops** with invited participants. The workshop series start with a limited number of high level participants and gradually expand to broader participation. This phased participation will reveal a spectrum of ethical, political, juridical, organizational and practical challenges to be tackled. Based on the first workshops, each Region will deliver a SWOT analysis on the regional implementation of the rewarding system. This SWOT is delivered early in the project because it is the projects mission to turn threats into opportunities and weaknesses into strengths. A reality check will be done by running the project's investments (WP4: investments in actual implementations of EbA measures) to a virtual application procedure(s) for PEbA schemes. From that exercise, we will deduct the practical/juridical/financial/ethical issues that would have been encountered [Figure 5: arrow 2 and 6]. WP1 will deliver a common approach and action plan to implement the PEbA scheme (O2). It also will deliver policy recommendations and guidelines that are specific for the involved regions.

Key-questions are:

- Who will be setting up and hosting such a fund to reward measures that promote infiltration and retention (BROKER)? Who will evaluate the applications for funding? Which measures are eligible for funding?
- How to create incentives for sellers (PAYMENT)? Can we differentiate the funding, based on location or effectiveness?
- Who can apply for funding (SELLERS)?
- Who will fund (BUYERS)?
- Who are the KNOWLEDGE PROVIDERS
- Are there conflicts with existing initiatives, programs, legislation?

WP3 takes the spatial prioritization further on by applying the WP2 tools on specific regions [Figure 5: arrow 3]. Identifying a physical potential for EbA measures is only the first step. WP3 addresses the Who, Where and What questions in a participatory vision building process. Each region will set up a participation process to determine a long term vision on the implementation of EbA measures. Starting from questioning "What is needed to achieve hydrological resilience against droughts", objectives are set to increase the natural supply. These objectives are then translated to a long term spatial vision and roadmap. WP3 will identify and map where particular EbA-measures are most effective and explore the attitude of municipalities and land-owners (potential sellers) towards implementation [Figure 5: arrow 1]. This will then provide feedback to WP1 [Figure 5: arrow 7].

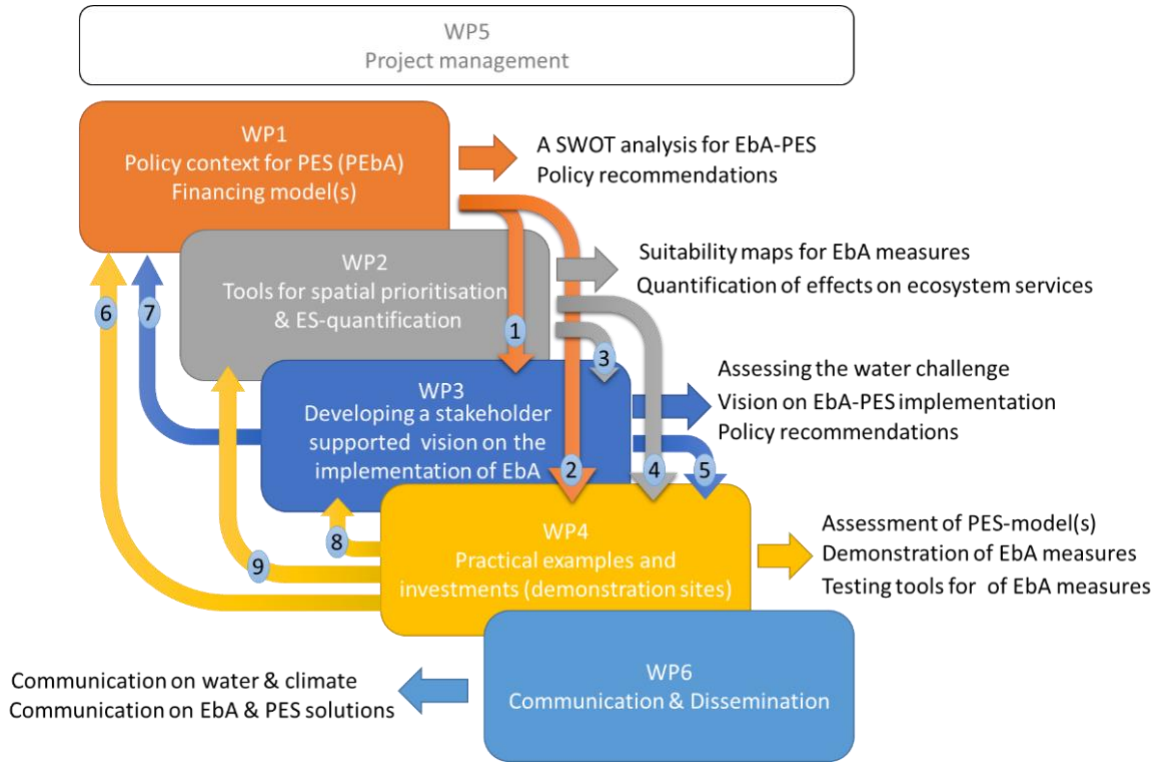


Figure 6. Visualization of the PROWATER workflow

2.2 Workshops

Each partner country organized a series of national/regional workshops that reflect on how we can operationalize a rewarding system for measures that promote infiltration and restoration. These workshops have the objective to reveal and discuss ethical, political, juridical, organizational and practical challenges.

The workshops will address these aspects throughout the PEbA process of:

1) Identifying EbA prospects, potential buyers and sellers;
2) Resolving institutional, legal and technical issues;
3) Negotiating contractual agreements;
4) Implementing and reviewing EbA agreements.

This will allow to explore some of the challenges such as transparency and complexity of schemes, what are the pros & cons of different scheme operators, whether to reward just restoration and what are future funding sources for the EbA (e.g. existing taxes on groundwater abstractions, big water consumers, voluntary contributions).
Each region starts with a few "policy oriented" workshops on the PEbA concept and these workshops are used as the basis for the SWOT-report.

Examples of questions/statements:

- Do you think such a subsidy is a good instrument to target restoration of hydrological services?
- Can this plug in with existing climate adaptation initiatives?
- Should this be an independent fund? How can that be set up?
- Is there a risk of "state aid" when this fund is managed by governmental organizations?
- Should it target specific areas? Should we exclude certain zones? (e.g. protected areas).
- Will this attract sufficient sellers (sufficient people willing to co-invest in common goods)?
- Should these be private sellers – with a private return on investment, or public funds – with a public return on investment? Or should it be a mixed model?
- ….

The workshop series start with a limited number of high-level participants and gradually expand to broader participation. For the first workshops, we invited people that have a bird's eye view on the topic of water security, climate adaptation and land-use planning. This phased participation will reveal a spectrum of ethical, political, juridical, organizational and practical challenges to be tackled. Based on these first workshops, each Region will draft a SWOT analysis on the regional implementation of the rewarding system.
A lot of work was spent on developing the methodology and planning of the workshops. We learnt a lot from the UK partners and have used this information to set up the workshops in such a way they can effectively draw the necessary information to develop a SWOT study for the Payment for Ecosystem Services.

A first workshop (half-day) was organized on the 13th of September 2018 in Antwerp. There were 22 participants present. The objective was mainly to inform observers and other stakeholder about the PROWATER project (concept, objectives, Ecosystem based Adaptation, Payment for Ecosystem Services, the planned investments and our communication plans). There was some time for Q&A.

A second workshop (full-day) was organized in Brussels on the 23rd of November 2018. There were 30 participants present. We started the meeting by presenting the PROWATER project. We presented PES examples and the PES-pyramid (Figure 6). In three groups of about 15 people, participants were asked to put (policy) programs, projects and measures on a large A0 PES-pyramid (Figure 7). Participants had to place measures/instruments/projects either at the base-middle or top of the pyramid – depending on the category in which they think it belongs. We also asked to put items that have high potential for climate adaptation at the right side and items with low climate adaptation potential (but with co-benefits) at the left side.

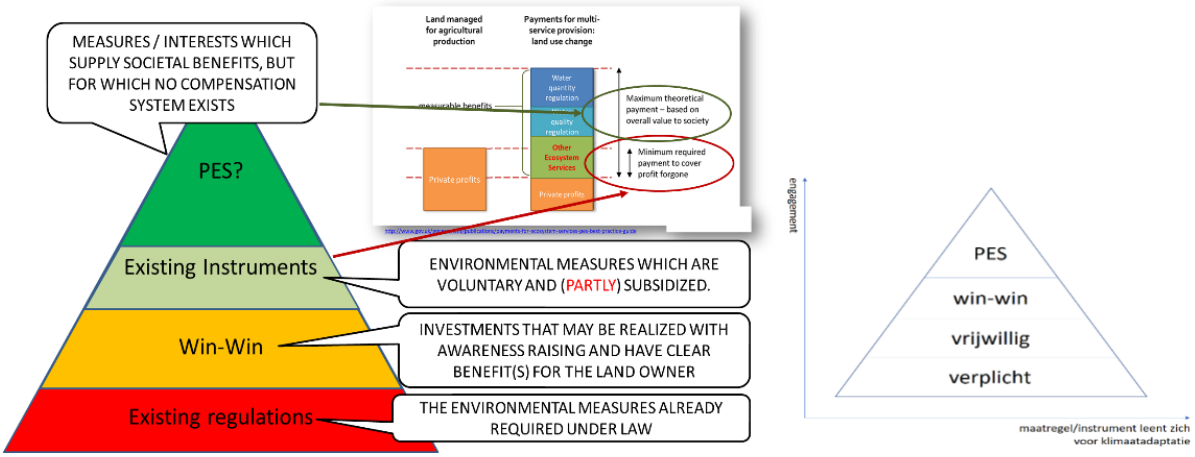
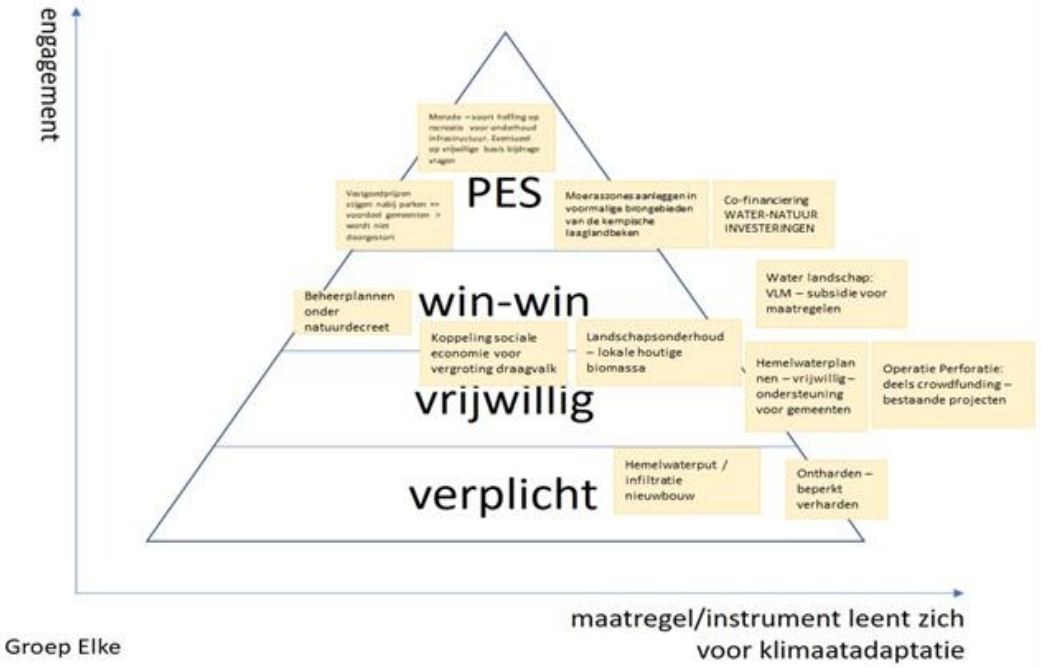


Figure 7. PES pyramid

Groep Jan



Groep Elke

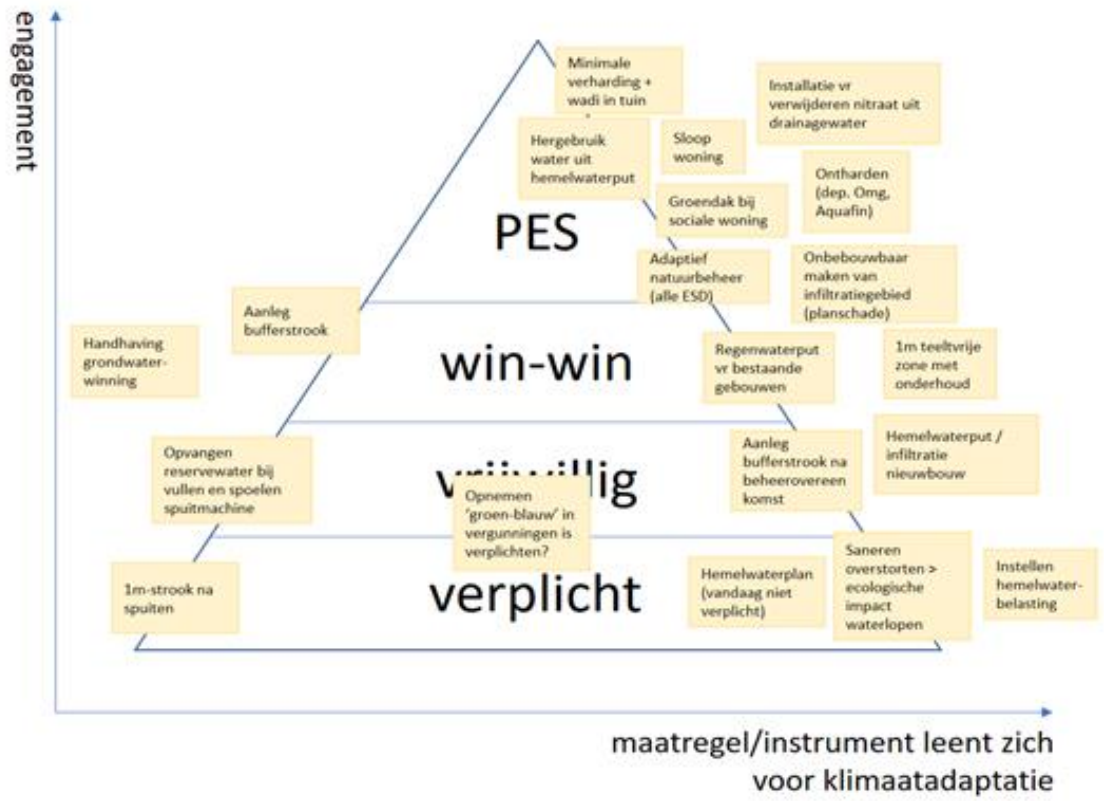
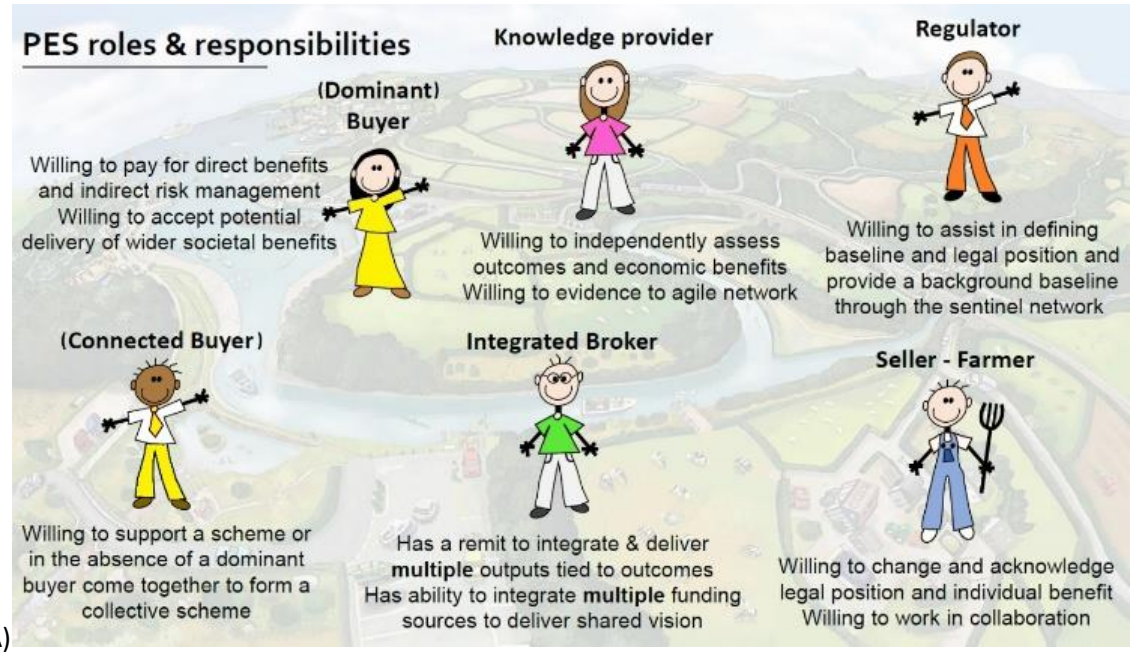


Figure 8. Workshop outcomes of three groups with indication of measures/instruments/projects on the pyramid for the Flemish context

This process resulted in an inventory of existing environmental legislation and subsidy programs that may be synergetic (or conflicting/competing) with the PEbA scheme.

In a second part we elucidated the different roles within a PES scheme (Figure 8). This was followed by a second exercise where participants were asked to put people and organisations on an empty A0 stakeholder map (Figure 9). This stakeholder mapping exercise allowed identifying all relevant stakeholders that may contribute to the PES. By placing their own and other organizations on the stakeholder map, it becomes clear which organizations and connections we have already reached and which we prefer to add to the network to help build a PES. Next, we indicated with colour which organization can play which role (according to the group). The roles ("as identified by Upstream Thinking") are on the table as a guideline. It is up to the moderator to ask people whether stakeholders can be linked to one or more roles.

A)



B)

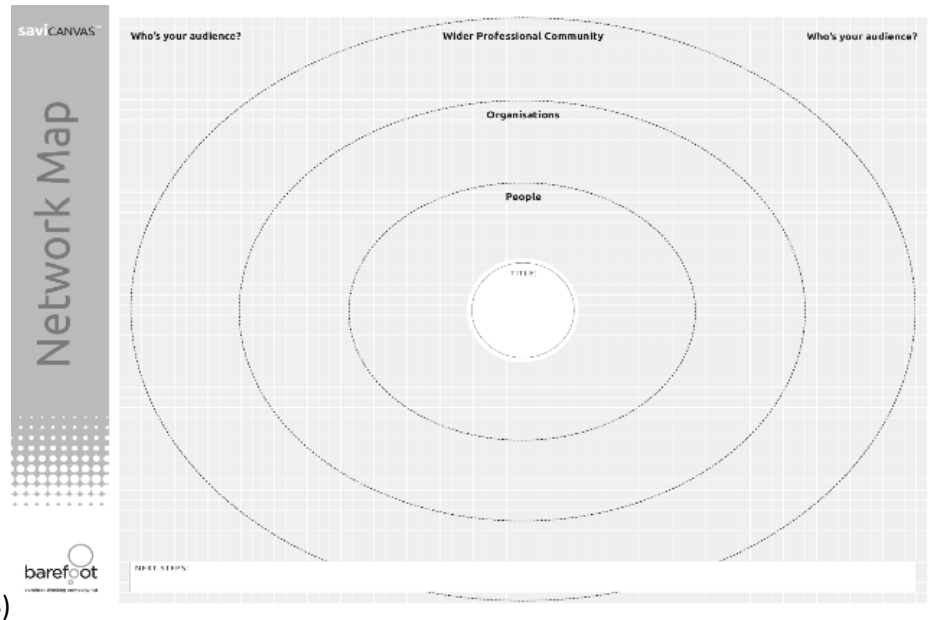
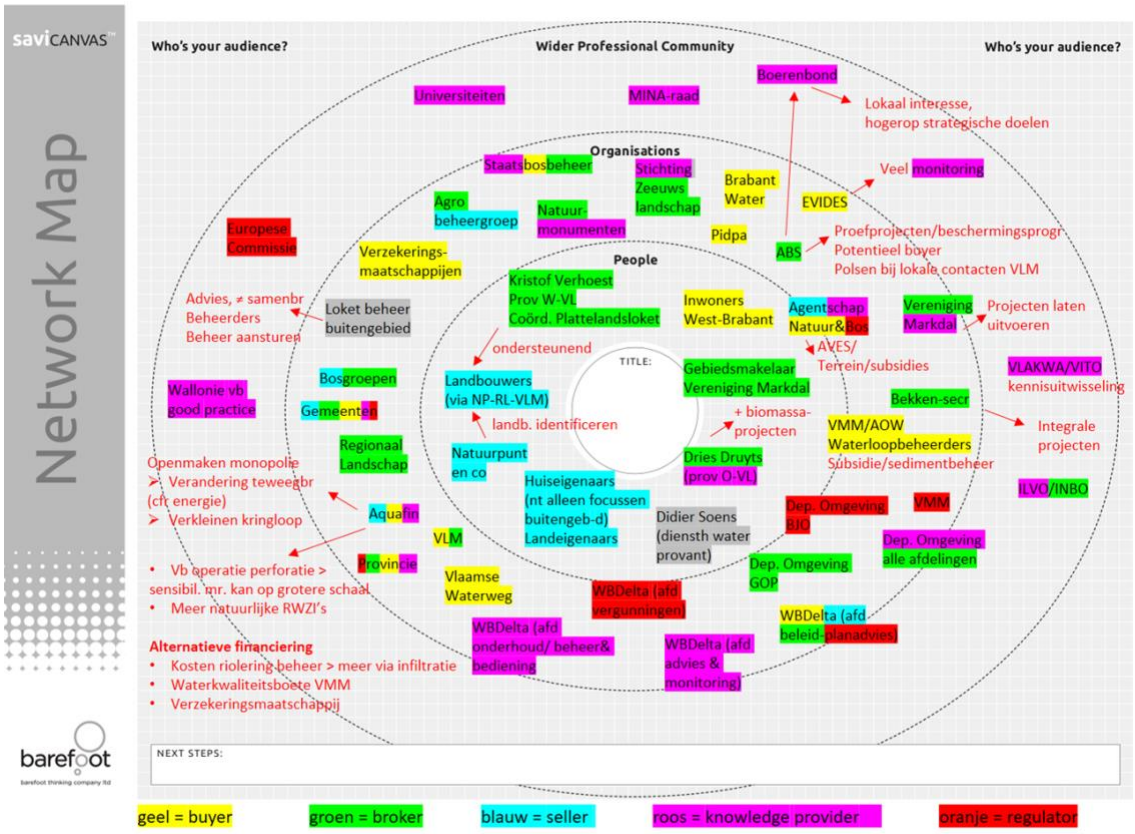
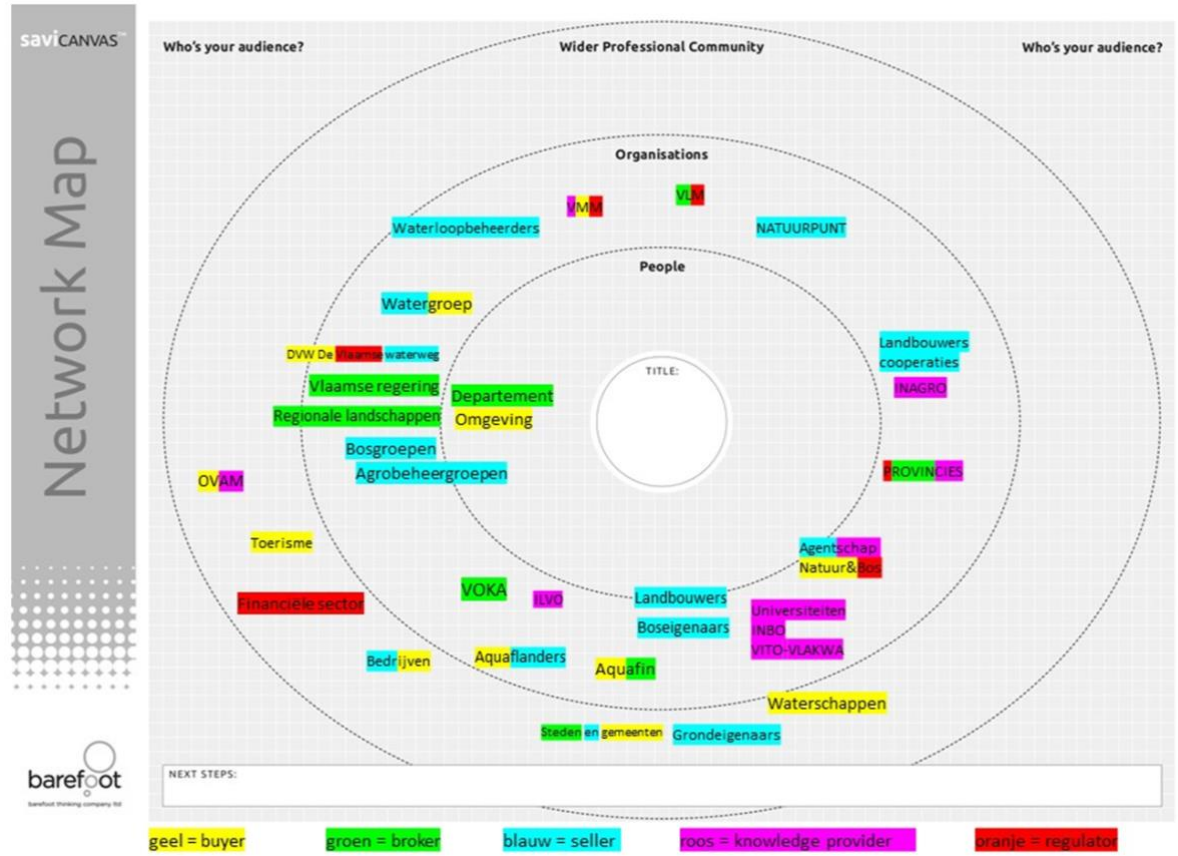


Figure 9. A) PES roles and responsibilities. B) Network map


savi CANVAS
Network Map
Who's your audience?
Wider Professional Community
Who's your audience?
Universiteiten
MINA-raad
Boerenbond
Lokaal interesse, hogerop strategische doelen
Organisations
Staatsbosbeheer
Stichting Zeeuws landschap
Brabant Water
Veel monitoring
EVIDES
Agro beheergroep
Natuur monumenten
Pidpa
Proefprojecten/beschermingsprogr
Potentieel buyer
Polsen bij lokale contacten VLM
Europese Commissie
Verzekerings-maatschappijen
ABS
People
Kristof Verhoest
Prov W-Vl
Coörd. Plattelandsloket
Advies, ≠ samenbr
Beheerders
Beheer aansturen
Loket beheer buitengebied
Inwoners West-Brabant
Agentschap Natuur&Bos
Vereniging Markdal
Projecten laten uitvoeren
ondersteunend
AVES/
Terrein/subsidies
TITLE:
VLAKWA/VITO
kennisuitwisseling
Gebiedsmakelaar Vereniging Markdal
Bosgroepen
Landbouwers (via NP-RL-VLM)
Wallonie vb good practice
Gemeenten
landb. identificeren
+ biomassa-projecten
Bekken-secr
Integrale projecten
VMM/AOW
Waterloopbeheerders
Subsidie/sedimentbeheer
Regionaal Landschap
Natuurpunt en co
Dries Druyts (prov O-Vl)
Openmaken monopolie
➢ Verandering teweegbr (cft energie)
➢ Verkleinen kringloop
Huiseigenaars (nt alleen focussen buitengeb-d)
Landeigenaars
ILVO/INBO
Dep. Omgeving BIO
VMM
Aquafin
Didier Soens (diensth water provant)
Dep. Omgeving alle afdelingen
VLM
Provincie
Dep. Omgeving GOP
• Vb operatie perforatie > sensibil. nr. kan op grotere schaal
• Meer natuurlijke RWZI's
Vlaamse Waterweg
WBDelta (afd vergunningen)
WBDelta (afd beleid-planadvies)
Alternatieve financiering
• Kosten riolering beheer > meer via infiltratie
• Waterkwaliteitsboete VMM
• Verzekeringsmaatschappij
WBDelta (afd onderhoud/ beheer& bediening
WBDelta (afd advies & monitoring)
NEXT STEPS:
barefoot
barefoot thinking company ltd
geel = buyer
groen = broker
blauw = seller
roos = knowledge provider
oranje = regulator


savi CANVAS
Network Map
Who's your audience?
Wider Professional Community
Who's your audience?
Organisations
VMM
VLM
Waterloopbeheerders
NATUURPUNT
People
Watergroep
DVW De Vlaamse waterweg
Landbouwers cooperaties
TITLE:
Vlaamse regering
Departement Omgeving
INAGRO
Regionale landschappen
Bosgroepen
Agrobeheergroepen
PROVINCIES
OVAM
Toerisme
Agentschap Natuur&Bos
VOKA
ILVO
Landbouwers
Financiele sector
Universiteiten
INBO
VITO-VLAKWA
Boseigenaars
Bedrijven
Aquaflanders
Aquafin
Waterschappen
Steden en gemeenten
Grondeigenaars
NEXT STEPS:
barefoot
barefoot thinking company ltd
geel = buyer
groen = broker
blauw = seller
roos = knowledge provider
oranje = regulator

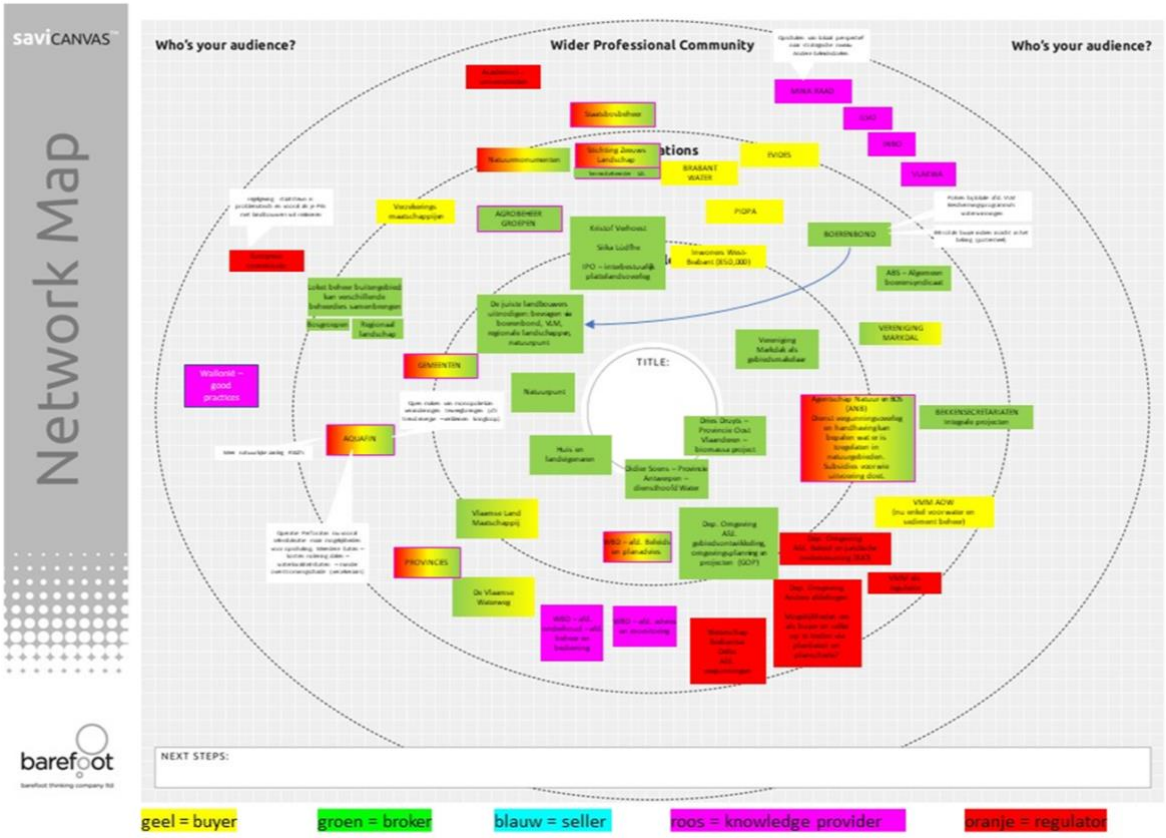


Figure 10. Workshop outcomes of three groups with indication of buyers (yellow), broker (green), seller (blue), knowledge provider (pink), regulator (red) for the Flemish context

On the 4th of February 2019, the Flemish Department Omgeving organised a full day symposium entitled "symposium on ecosystem services: towards a robust and climate-resilient environment". There were over 200 people present from various sectors. In the Afternoon, PROWATER engaged to organise 2 interactive sessions (13:30-14:30 & 14:40-15:40). At each session about 30 people were present. We presented the PROWATER project and PES-concepts and opened a broad discussion on the SWOT of implementing a PES-scheme in Flanders. We harvested a lot of new elements, especially because this group was quite different from the previous workshops. These sessions can also be seen as a half-day PROWATER workshop.

A **third workshop** (full day) was organised in Brussels on the 20th of February 2019. There were 24 participants present. At this workshop we again presented PROWATER, but this time we also presented preliminary findings of the previous workshops and used this to develop a more elaborated concept for a Flemish PES scheme. This was lively discussed in a plenary session. In the afternoon, we presented concrete measures to increase infiltration and retention. We then presented a landscape - using spatial prioritisation maps and aerial pictures - and depicted where opportunities for EbA measures are present. By zooming in on three zones, corresponding with resp. remediating soil sealing, forest conversion and water retention (Figure 10, 11), the participants were asked to reflect on the potential co-benefits of implementing measures. Who are the beneficiaries (buyers), what is the context and position of the land-owners (sellers), and who could be potentially a broker to provide leverage to implementation?

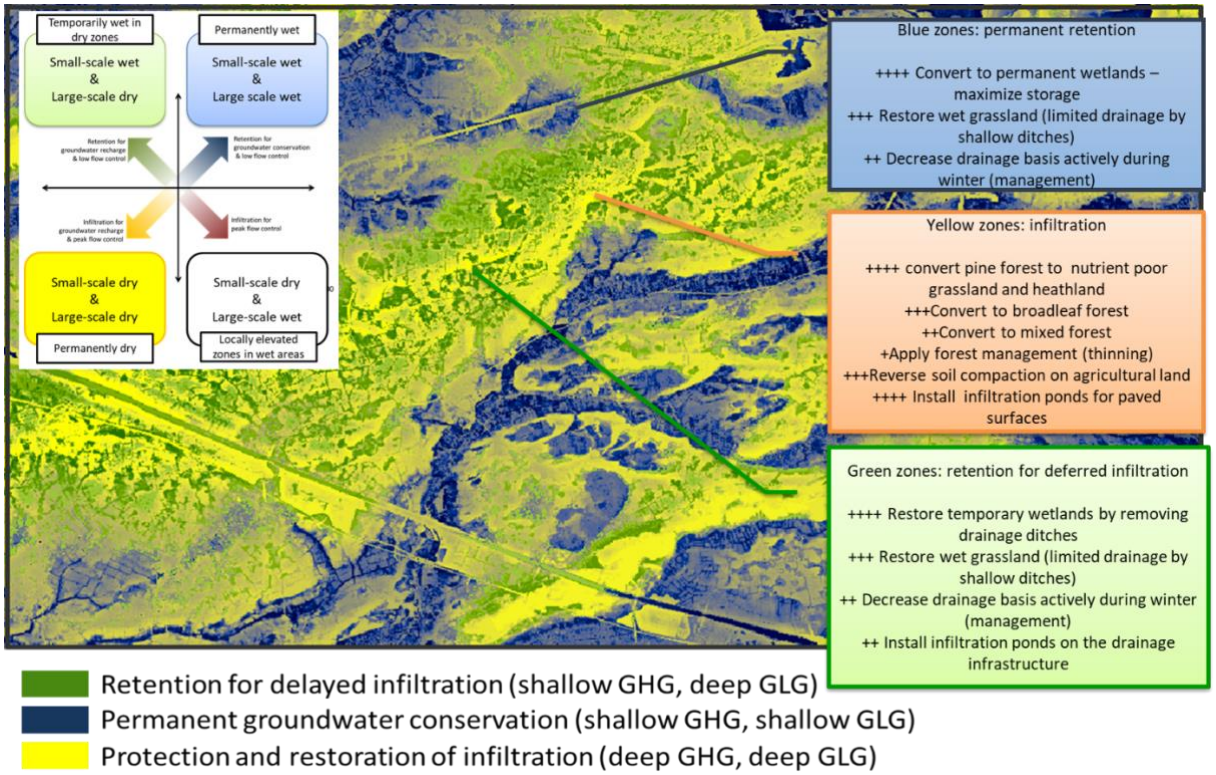


Figure 11. Three zones for different opportunities for EbA measures: retention for delayed infiltration in temporarily wet areas in dry zones (green zones), permanent groundwater conservation in permanently wet zones (blue zones), and protection and restoration of infiltration in permanently dry zones (yellow zones).

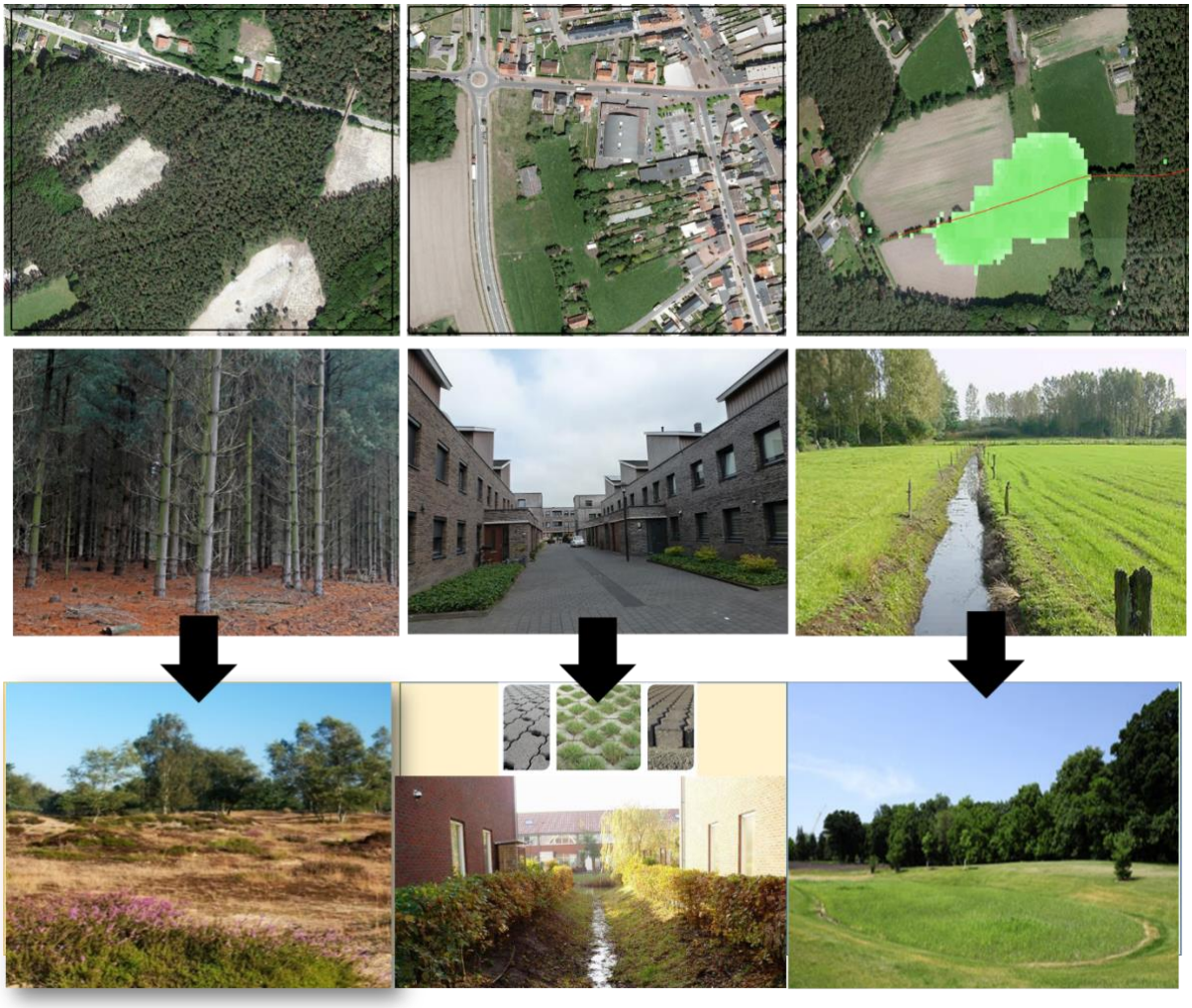


Figure 12. Examples of measures that improve retention and infiltration. Left: unmanaged pine plantations on dry elevated soils intercept a lot of precipitation in their dense canopy and thick litter layer. Middle: Paved surfaced cause soil sealing and in many cases run-off water is collected and piped to nearby streams. Instead, runoff water should be collected infiltrated locally in wide open ditches. Right: A natural landscape depression on a slowly permeable subsoil which is drained for agriculture. Drainage can be minimized by placing adjustable weirs and the lowest part of the depression can be restored to act as a buffer to allow deferred infiltration.

There will be 1 more **workshop** in WP1 (planned on June 14th 2019, in Mechelen), targeting spatial prioritization and how land-owners perceive the fact that the reward for implementation would be based on effectiveness. Spatial targeting improves both, environmental effectiveness and economic efficiency by targeting payments to most suitable locations and measures. Targeting payments to areas where they are most needed increases environmental effectiveness but differentiating this is rather new in the Flemish Region. We will inform the participants on how the physical system (topography, soil and hydrology) plays a crucial role in the spatial prioritisation of measures. We will interactively discuss the implications for land-owners and debate whether the PES-model should openly use fixed rules (formulas) to quantify the eligible payment, or whether we should keep this more flexible to allow the broker to negotiate payments with the land-owner. We will also investigate the concept of auctions to buy landscape restoration measures.

3 Results

During the different workshops, many aspects of developing a PEbA were discussed. We organised the SWOT analysis in four themes: legal context, PES mechanisms, participants, and transaction payment.

3.1 Legal context

S	○ There are currently no specific subsidies or instruments that promote infiltration and retention measures on a structural basis. This PEbA (payment for Ecosystem based Adaptation) is a strong and unique niche that is not in conflict with existing policies and instruments. PROWATER can fill this gap.
W	○ The willingness to pay for ES is limited because some people consider that good land stewardship should be the norm. Payment leads to ethical discussions on whether one should reward to restore or reward to maintain the good stewardship. In other words - rewarding someone for restoring something that was destroyed in the first place. Moreover, the question arises as to why one landowner is rewarded for a certain intervention and the other not. ○ The workshops have revealed that regulators are of crucial importance, but that there is also little expertise available. Legal certainty for both "buyer" and "seller" is very important. Regulators have to determine the rules of the game for PES. What is considered mandatory, voluntary and eligible? Where is the reference for rewarding or enforcing recovery? What if commitments are not met? How does control and enforcement work? Are the contracts/regulations concerning the implementation and maintenance of measures transferable and inheritable? Are they linked to the title deed? They must also ensure that the schemes do not conflict with other legislation in force (e.g. on state aid). Such aspects will be further explored in the future.
O	○ The environment indicators for the Flemish Region are showing that water quality and biodiversity are decreasing or not improving as expected. Both the 'Manure Report 2018' of the Flemish Land Agency and the report 'Nutrients in surface water in agricultural area (2017-2018)' of the Flemish Environment Agency show that the water quality in agricultural areas does not improve. The quality objectives for surface water and groundwater from the fifth manure action programme will not be achieved. Farmers can expect a more stringent regulation and enforcement in the future. It is unlikely they will be rewarded or compensated for implementing these regulations. On the other side, engaging in voluntary PES schemes to improve water quantity and quality does provide a revenue model for farmers. The farmers may prefer that engaging in PES is voluntary.
T	○ The government will have legal issues when directly supporting farmers (or landowners in general) to implement measures. EU State aid regulations are stringent and limit pay for ES. ○ The public funding of an independent company or NGO may cause issues and can be limited by State Aid when using public money as a funding source for an economic benefit. ○ The issue of tenant versus land-owner may impede the PEbA concept. This is a specific problem for measures on farmland hydrology. To what extent must a land-owner give consent to implement measures on the land that have long-lasting effects? On the other hand, farmers do install drainage infrastructure and/or elevate their lands without consent of land-owners?

3.2 PES mechanism

S	○ Abstractors of groundwater must pay a groundwater abstraction levy. This taxation is currently used for general purpose in the governmental budget. Using these funds to re-invest in groundwater quantity and quality seems very fair and logical. This can be supported by policy-makers.
W	○ The groundwater levy is a taxation and not a retribution. Therefore, it is not allowed to use these funds for a specific purpose. This is the same for the levy on waste water disposal.

O	○ The groundwater abstraction levy could be a basic funding of the PEbA. Currently, water companies can already substract active surface water infiltration from their annual abstractions. Active infiltration of surface water (from streams & canals) is currently only used in a few occasions where a canal is passing a water abstraction site.
T	○ /

3.3 Participants

During the workshops it became clear that many organisations see themselves playing a role in all positions and aspects. They are seller, buyer, broker and knowledge provider. But the organisation's commitment to the PES model is less clear. Is this only about wanting to be involved in the process, or can they actually play an active and positive role?

Most discussions were about the role of broker. Do we have an existing organisation in Flanders that can take the role of broker? Do we need a new institute as broker? What are requirements for the broker?

S	○ An independent company or NGO can be a broker of the PEbA ○ The model of the regional water management agency's or water management boards ("waterschappen"; The Netherlands) is a good example of how PES can be arranged in an implicit way. They have their own taxation system, where buyers (funders) are companies (incl. farmers) and residents. The waterschappen do investments to maintain a balanced water system. This includes water management actions that relate to climate adaptation (e.g. management for flood safety, but also the placement of controllable weirs on ditches to actively retain water during winter).
W	○ There are many organisations that possibly may want to claim the role of broker. The question is whether all these organizations can be an "integrated broker". An "integrated broker" must be sufficiently independent/independent to honour the entire spectrum of possible (climate) benefits in a fair manner. Organisations that are strongly bound to a certain sector can play a facilitating role towards their target groups (sellers) but aren't independent enough to gain trust among all involved parties. ○ There is no comparable water governance in the Flemish Region. The basin secretariats and the commission on integrated water management rely on a model of cooperation. The basin secretariats have developed into an important mediator for voluntary cross-policy cooperation. But they aren't comparable to the Dutch Water Management Boards ("waterschappen"), which are independent governance structures that are legal entities and have democratic representation. Although they can implement measures independently, there are still limitations to the implementation of PES (state-aid to farmers).
O	○ Good communication with strategic partners can provide leverage to the implementation of measures. Strategic partners are those organisations that are involved in water policy & management (flood risk management, water quality), groundwater policy & management (the monitoring of groundwater and permitting of groundwater abstractions), forest policy & management (for biodiversity, game and timber), water sanitation and sewage infrastructure, agricultural policy & rural development. There are important win-win's that need to be explored. At the same time, we need to identify potential conflicts and explore solutions.
T	○ The envisioned EbA measures are closely related to existing policies. There is already a policy to promote water infiltration from sealed surfaces and rooftops, but the objective is mainly to prevent water nuisance (sewage system overflows). There is already a policy to promote forest conversion, but the objective is to increase forest biodiversity (mixed forests with native species). There is a potential threat when measures, rather than objectives reside under the authority of specific organisations.

	○ The Flemish government takes care of the environment with tax money. In Flanders, we have many rules and regulations, which are than scattered across many public institutions and organisations. We identified public organisations that can be buyer, seller and broker at once.

3.4 Transaction payment

Long discussions where about the payment. How much should a buyer pay? How much should a seller receive? How to calculate the amount?

S	○ The PES pyramid principle: Landowners can only enter a (profitable) payment scheme when they fulfil all conditions of legislation in force. This can be an effective way for law enforcement. The current law-enforcement in the field of environmental crimes is often weak. ○ The drought episode during the summer of 2018 provides leverage to the objectives of PROWATER. Increasing the hydrological resilience to drought is on the policy agenda. PROWATER meets this demand. The location of specific procedures is determined on the basis of specific tools of PROWATER. ○ The costs of implementing PEbA can be substantially lower when prices are set by market mechanisms where the landowners offer to deliver services for a certain price. Variable price-setting is desirable because the effectiveness of the measure may vary strongly depending on location (subsoil, hydrology, topography). The concept of reverse auctions is promising. Each landowner can negotiate compensations for the measures they offer and decide whether this is attractive or not. From the buyer's perspective, the same principle is applied (is this an effective location for implementing a particular measure).
W	○ In the Flemish Region, there are already many programs and measures to improve environmental quality. The environmental policy and management landscape are highly fragmented. There are many players that promote their specific measures through subsidies. ○ The payment should be related to measurable, verifiable outcomes that go beyond what would have happened in the absence of the payment scheme. But EbA measures deliver the most during extreme weather events and they cannot be "measured" or "verified" in the field. Retained water can be measured, but the component that already infiltrated can't be measured on-site. ○ Depending on the location and spatial context, an intervention can be easier/more difficult to implement and/or also generate fewer/more benefits. An administrative determination of the compensation will be highly complex. Give more compensation because it requires more effort? Give less compensation because there will be fewer benefits? ○ Fixed price: unfair because there are local differences in implementation cost, effectiveness and income loss. ○ Variable price: unfair because it depends on the negotiation skills of the landowner. If pricing from neighbouring land-owners becomes public, this may be detrimental to social relations and trust in the broker. It takes a while before landowners can do benchmarking on what is a fair price.
O	○ Payment schemes should capture all effects of ecosystem management (e.g., affecting multiple ES). By stacking all ES co-benefits, the potential payment becomes higher and this provides more leverage for implementation. ○ Recreation and health effects of green space are regularly cited as something for which a "payment" may be allowed. Also, because green infrastructure needs management and maintenance. This maintenance often takes place in combination with social employment. The proximity of green space can also have indirect effects on property value, and in that case the added value could be returned as payment. ○ The impact of EbA measures on hydrological resilience can be relatively well modelled ex-ante. Spatial prioritisation and estimation of effectiveness can be mapped and modelled using weather/climate scenarios. ○ The instrument capital damage compensation ("kapitaalschadecompensatie") can be used to compensate land-owners for particular restrictions on their land that are imposed by (new) land management plans. "Capital damage" is the damage that the owner of an agricultural land

	suffers as a result of: 1) a change in the use of agriculture in nature, forest or other green areas; 2) the inclusion in a plan of an overpressure affecting the economic use of agricultural land; 3) the imposition of easements affecting the economic use of agricultural land. Such easements can also be related to climate adaptation measures - e.g. not allowing to drain land or seal the soil. The compensation for capital damage amounts to 80% of the depreciation. For each plan that causes capital damage, a provincial capital damage committee draws up a capital damage report. This report contains the data for calculating the damage. This considers the reduction in the use value and price data of land in the region. This poses a possibility to implement long-term measures on farmland and a structural compensation of economic damage.
T	○ When the PES is broadened to many ES, this also implies the involvement of many organisations and stakeholders. There is a threat that these organisations cannot take distance from the execution and realisation of their measures. This can add a lot of complexity to the PES-scheme, making it less flexible and dynamic. ○ The Flemish land-owners may expect a fixed price or at least a fixed procedure to quantify the amount of the reward. This is the case for most agri-environmental schemes. This does not account for regional differences in soil quality and yield. While the set price does not compensate for income loss in one region - it overcompensates income loss in other regions. Consequently, the success of the agri-environmental schemes is very region-dependent. The landowners may be opposed to the concept of variable prices for PES.

4 Conclusions and Key Findings

We will summarise the lessons that we learned based on our workshops and we will add a broader reflection based on international literature on strengths, weaknesses, opportunities and threats of PES (APPENDIX 1).

PES may replicate the incentive effects of markets in cases where the provision of environmental public goods depends on private activity (Kinzig et al. 2011). Therefore, a PES system is suitable to finance EbA measures to promote upstream infiltration and retention because it serves public benefits (water management) but has to be taken on private agricultural land.

Legal context

PEbA can fill the gap when no subsidies or instruments exist to promote infiltration and retention measures on a structural basis. PEbA provide a new revenue model for landowners. However, PEbA is limited to matters that are not yet regulated with current legislation and subsidies. EU State aid regulations do not allow to pay for ES (using public money as a funding source for PES). Therefore, regulators are of crucial importance to determine the rules of the game for PEbA (mandatory, voluntary and eligible; control and enforcement). However, there is little expertise available.

The issue of tenant versus land-owner may impede the PEbA concept. This is a specific problem for measures on farmland hydrology. To what extent must a land-owner give consent to implement measures on the land that have long-lasting effects? On the other hand, farmers do install drainage infrastructure and/or elevate their lands without consent of land-owners? Viszlai et al. (2016) discusses a similar problem in the context of forest land; ownership and tenure rights for forests are not always clear and well identified (e.g. because of restitutions of forest land).

PES mechanism

A PES fund can be supplemented with groundwater levies and collected in an adaptation fund. Currently this exists already as an 'in natura' system: water companies can already substract active surface water infiltration from their annual abstractions. However, there are legal restriction to use the groundwater levy for specific purposes (because it is a taxation, not a retribution). Same for levy on waste water disposal. PES could unlock new or alternative funding opportunities, at least for land-managers (Waylen and Martin-Ortega 2018). As part of a broad opportunity assessment, an analysis of available funding streams is advised to identify potential sources of finance to bolster or extend the scheme (DepEFRA 2013).

The PES pyramid principle provides a law enforcement tool (participants need to fulfil all conditions of legislation in force).

PES captures multiple ES benefits resulting in higher payments (more leverage for implementation). It can also include payment for recreation and health effects of green space. This is challenging in the Flemish Region as environmental policy and management landscape is highly fragmented (many programs and measures related to environmental quality, different subsidies). A broad PES scheme including many ES results in more complexity (more organisations and stakeholders involved). The PES scheme becomes less flexible and dynamic.

It is important to consider mitigation measures to deal with risk and uncertainty. Reasonably foreseeable external changes should be reflected in the baseline that will be used to gauge

additionality. Flexibility and the scope for adaptive management should be incorporated within PES schemes in order to accommodate external changes (DepEFRA 2013). Furthermore, if the risk of interventions being undermined is high, insurance should be considered as part of the scheme. Sellers must demonstrate their commitment to permanence by maintaining their measures even when it is lost of destroyed due to wind, fire, pests, diseases or development (DepEFRA 2013).

Participants

During our workshops, most discussions on participation related to the role of **broker**. The Dutch Waterschappen are considered as a good example (implicit PES mechanism). No existing organisation in the Flemish region that is a good broker; maybe basin secretariats, or commission on integrated water management. Many organisations are candidate as broker, but they are mostly linked to a sector and hence not an "integrated broker" to work independently with all involved parties. The envisioned EbA measures are closely related to existing policies (often similar measures but with other objectives). Flemish region has a strong government with many rules and regulations, which are than scattered across many institutions and organisations. Most organisations are through their activities and responsibilities broker, buyer and seller. Finding an independent broker in Flanders, being an independent company or NGO, is not evident.

The role(s) of the government and all other potential PES participants (at different levels) should be clearly defined; facilitator, (co)funding institution, …

Good communication with strategic partners can provide leverage to the implementation of measures.

During the workshops there was no discussion on who should or should not be a seller. However, there is a risk that payments might be targeted at the wrong land or resource managers because of shortcomings in the evidence base (for example, uncertainty as to whose land plays a critical role in water quality regulation) (DepEFRA 2013). Potential mitigation measures for this risk, if necessary, is primary research to identify whose actions have the capacity to increase supply of the service in question. If identification proves problematic it might be possible to aggregate clusters of sellers for payment (for example, sellers across a catchment) (DepEFRA 2013).

In PES literature, a lot of attention goes to the behaviour and motivation of participants. This was not really addressed during our workshops. One issue is that payments might undermine or crowd out intrinsic or altruistic motivations to undertake an activity (Muradian et al. 2013, Chan et al. 2017). To address this, the scheme should incorporate measures to minimise the risk of creating perverse incentives, for example guidelines on the way in which ecosystem service outcomes should be achieved and maintained (DepEFRA 2013). Another approach is by paying only a part of a participant's opportunity costs (Chan et al. 2017). As such, a PES program might crowd in intrinsic motivations rather than crowd them out. Tools for a new approach are co-payments or in-kind payments (Chan et al. 2017).

Another issue that is discussed in PES literature, is the fact that it is perceived as unfair. For example, to maximise the provision of additional ecosystem services, the funds available through a PES scheme would be best directed to those whose land or resources had the greatest potential to deliver additional services and away from those whose land or resources already provided the required services. This could lead to payments being made to land or resource managers who had not previously managed their land or resources in an environmentally-sensitive manner and so prompt accusations of unfairness (DepEFRA 2013). In establishing the baseline it should be apparent if levels of existing land stewardship are markedly different and whether this has any implications for the distribution of payments to sellers. If there is a marked discrepancy, the bar may need to be set higher in terms of the

interventions that qualify for payment (DepEFRA 2013). This is the reason why we work with the PES-pyramid (Figure 4). PES should be additional to existing regulations, subsidies and awareness raising initiatives to maintain current minimal standards. As such it can be used to activate and reinforce participants and provide an inclusive program that feels fair. Tools for a new approach can include rewards and support for existing good stewards (Chan et al. 2017).

If participants engage in a program primarily for monetary benefit, there is an unavoidable incentive for ES providers to cut corners or shirk responsibilities, which has led to costly on-ground monitoring to ensure that participants are doing as they should (Chan et al. 2017). ES provider incentives to cheat are greatly reduced when providers make a publicly conspicuous commitment. The design of co-payments, which intend to ensure that the program is attractive only to those with intrinsic incentives, thereby greatly reduces the individual motivation to cheat. Tools for a new approach are peer monitoring, and landowner-identified valued activities (e.g. via reverse auctions) (Chan et al. 2017).

Many PES programs fund particular actions on a one-size fits-all basis, which incurs the risk that would-be participants might recoil from such prescriptions due to conflicts with their own values or restrictions on their creativity and wisdom as stewards of the land (Chan et al. 2017). If program officials do not dictate appropriate stewardship actions, but rather invite ES providers to propose what they would like to do (that contributes to specified environmental outcomes), there's an immediate inspiration of the creative agency of producers as stewards. Tools for a new approach are landowner-identified valued activities (e.g. via reverse auctions), or participatory program design (Chan et al. 2017).

Payment

An administrative determination of the compensation will be highly complex. Payment schemes should capture all effects of ecosystem management (e.g., affecting multiple ES) (Kinzig et al. 2011). Most of the compensation mechanisms in the PES schemes are based only on “opportunity cost”, which means lost timber income (Viszlai et al. 2016). The payment should include the profit forgone (minimum required payment), but also the overall value to society (maximum theoretical payment) (Figure 3). However, it is hard to measure nature values and ecosystem services (Viszlai et al. 2016). Each group of ecosystem service require specific valuation methods, but Valuation methods could introduce bias depending on assumptions and available (local) data (Viszlai et al. 2016).

Both fixed prices and variable prices are considered to be unfair. Variable price-setting is desirable. The payment should be related to measurable, verifiable outcomes. EbA measures deliver the most during extreme weather events and they cannot be "measured" of "verified" in the field. The impact of EbA measures on hydrological resilience can be relatively well modelled ex-ante. Spatial prioritisation and estimation of effectiveness can be mapped and modelled using weather/climate scenarios. The location of specific implementation measures is determined on the basis of specific tools. This will also determine the price of these implementations.

The Flemish land-owners may expect a fixed price or at least a fixed procedure to quantify the amount of the reward. But the success of a scheme is very region dependent. The concept of variable prices for PES may be opposed to by landowners. This is also discussed in international literature : “Spatial targeting improves both, environmental effectiveness and economic efficiency by targeting payments to most vulnerable, degraded or suitable lands. Consequently, ES are either provided at lower costs than elsewhere (Uthes et al., 2010) and/or payments are targeted to parcels with highest degradation risk and thus to areas where they will have the largest impact (Robalino et al., 2008). Targeting payments to areas where they are most needed (Sierra and Russman, 2006) increases environmental effectiveness.” From (Schomers and Matzdorf 2013).

Market mechanisms where the landowners offer to deliver services for a certain price (concept of reverse auctions) is promising. The instrument "kapitaalschadecompensatie" (capital damage compensation) can be used to compensate land-owners for particular restrictions on their land that are imposed by (new) land management plans. "Capital damage" is the damage that the owner of an agricultural land suffers.

One suggestion is performance payments, to relate payments to actual ES provision (Schomers and Matzdorf 2013). In contrast to payments prescribing certain actions or inputs, performance payments are likely to improve economic efficiency and environmental effectiveness. Performance payments often require only one final inspection visit, thus decreasing overall monitoring costs. However, payments must be tied to observable and therefore often distorted indicators. Consequently, reliable indicators need to be developed; otherwise payments might be distributed despite missing ES provision (Schomers and Matzdorf 2013).

Another suggestion is to make use of auctions. Auctions are a contractual design feature that invites potential ES suppliers to submit price offers at which he is willing to sign a PES contract. Bids must be competitive as only reasonable offers might be contracted. Auctions help to reveal private willingness-to-accept (WTA) and private opportunity costs. It is a mechanism to enhance economic efficiency and environmental effectiveness of PES contracts as informational asymmetries and consequently informational rents are reduced. The cost-revelation mechanism allows for cost savings for the ES buyer as payments are minimized (Schomers and Matzdorf 2013).

Effectiveness of the PES

A literature review of the effectiveness of PES by (Salzman et al. 2018) reveals that spending money, in and of itself, does not guarantee provision of valuable ecosystem services. For most programmes, we simply do not know their effectiveness. Like most conservation programmes, PES schemes are rarely established with a rigorous evaluation of effectiveness in mind. Researchers studying them at a later date have often lacked baseline data, control areas or randomized design, making it difficult to evaluate counter-factuals—what would have happened without a PES programme?

There can be a risk that the interventions will be too short-lived to deliver the necessary ecosystem service benefits. The scheme should incorporate safeguards to ensure the permanence of the interventions where possible. Generally speaking, permanence can be encouraged through including 'no regrets' interventions within the PES scheme. These are measures which, from a seller's perspective, are 'worth doing anyway' (for example, to save on utility costs) (DepEFRA 2013).

When designing a PES, it is important to be aware and prevent the generation of new externalities, unwanted feedbacks, leakage (pressure on ecosystem services elsewhere) and trade-offs (at the expense of other ecosystem services) (Kinzig et al. 2011, DepEFRA 2013, Viszlai et al. 2016, Chan et al. 2017). Several mitigation measures are suggested. Ensure that arrangements for monitoring extend beyond the geographic boundaries of the PES scheme in order to assess the magnitude of any leakage and consider any potential conditions of contract that might be introduced to minimise leakage (DepEFRA 2013). The scheme should incorporate safeguards to minimise the risk of trade-offs. By rewarding stewardship instead of particular pre-defined actions or outputs, programs could close the loopholes that inevitably arise with any fixed metric for payment, thus reducing the risk of new externalities (Chan et al. 2017). Tools for a new approach are multiple ecosystem service targets, and flexibility in supported activities (Chan et al. 2017).

5 Next steps

We can make a proposal for PEbA based on this SWOT. The practicability will depend on the adaptation plan, the adjusting of existing subsidies and of the implementation of the legislation. The adaptation by ecosystems and biodiversity is very effective for adaptation but can also help to the mitigation of climate change (and other benefits; economic, social, political,…). This reinforces the possibilities of this PES system and avoids negative effects on other systems. An “opportunities assessment” as a review of relevant policies, plans, programmes, strategies and initiatives to identify any wider environmental or sustainability objectives which the PES scheme might be designed to reflect and contribute to, could strengthen this reinforcement. (Question: Who will coordinate this?)

It is important to be able to measure and monitor the effectiveness of PEbA. This should be taken into account while establishing the PES schemes. Also a cost/benefit analysis can contribute to an efficient monitoring system.

The importance of picking the right momentum to introduce (new) policy. In Flanders there are some opportunities to create links with the drought plan (which should be adopted soon) and the Flemish Adaptation Plan. In this regard other institutions (like VMM, CIW) should be involved.

6 References

Chan, K. M. A., E. Anderson, M. Chapman, K. Jespersen, and P. Olmsted. 2017. Payments for Ecosystem Services: Rife With Problems and Potential—For Transformation Towards Sustainability. Ecological Economics **140**:110-122.

Departement Omgeving. 2018. Beleidsplan Ruimte Vlaanderen. Strategische visie. Vlaamse Overheid, Departement Omgeving, Brussel.

DepEFRA. 2013. Payments for Ecosystem Services: A Best Practice Guide. Department for Environment Food & Rural Affairs, London.

Hack, J. 2013. Payments for Hydrological Ecosystem Services in Integrated Water Resources Management [Ph.D. Thesis]. Technische Universität, Darmstadt

Kinzig, A. P., C. Perrings, F. S. Chapin, S. Polasky, V. K. Smith, D. Tilman, and B. L. Turner. 2011. Paying for Ecosystem Services—Promise and Peril. Science **334**:603-604.

Mayrand, K., and M. Paquin. 2004. Payments for Environmental Services: A Survey and Assessment of Current Schemes. Technical Report September. Unisféra International Centre, Montreal, Canada.

MEA. 2005. Ecosystems and Human well-being: current state and trends. Millenium Ecosystem Assessment. Page 155. Island press, Washington.

Muradian, R., M. Arsel, L. Pellegrini, F. Adaman, B. Aguilar, B. Agarwal, E. Corbera, D. E. d. Blas, J. Farley, G. Froger, E. Garcia-Frapolli, E. Gomez-Baggethun, J. Gowdy, N. Kosoy, J. F. L. Coq, P. Leroy, P. May, P. Meral, P. Mibielli, R. Norgaard, B. Ozkaynak, U. Pascual, W. Pengue, M. Perez, D. Pesche, R. Pirard, J. Ramos-Martin, L. Rival, F. Saenz, G. V. Hecken, A. Vatn, B. Vira, and K. Urama. 2013. Payments for ecosystem services and the fatal attraction of win-win solutions. Conservation Letters **6**:274-279.

Rekenhof. 2014. Bescherming en herstel van de grondwatervoorraden. Grondwatervergunningen, grondwaterheffing en steun voor grijswaterprojecten. Rekenhof, Brussel.

Salzman, J., G. Bennett, N. Carroll, A. Goldstein, and M. Jenkins. 2018. The global status and trends of Payments for Ecosystem Services. Nature Sustainability **1**:136-144.

Schomers, S., and B. Matzdorf. 2013. Payments for ecosystem services: A review and comparison of developing and industrialized countries. Ecosystem Services **6**:16-30.

Viszlai, I., J. I. Barredo, and J. San-Miguel-Ayanz. 2016. Payments for Forest Ecosystem Services. SWOT Analysis and Possibilities for Implementation. EUR 28128 EN. European Commission.

Waylen, K. A., and J. Martin-Ortega. 2018. Surveying views on Payments for Ecosystem Services: Implications for environmental management and research. Ecosystem Services **29**:23-30.

7 APPENDIX 1. International literature study on PES (SWOT analysis)

We did a brief literature review to get a broader insight in strengths, weaknesses, opportunities and threats of PES. Two studies in particular discuss several failings/shortcomings of PES programs, but they provide also potential solutions to make PES work (Kinzig et al. 2011, Chan et al. 2017).

7.1 PES around the world and in Europe

The following information is found in the literature review comparing payments for ecosystem services in developing and industrialized countries (Schomers and Matzdorf 2013).

It appears that the international PES discourse refers mostly to conservation efforts in developing countries and specifically to two governmental programs in Costa Rica and Mexico (Rodriguez, 2002). Incentive payments to foster environmental protection and to stimulate beneficial ecosystem services have been in place in Europe since the 1980s, culminating with the introduction of Agro Environmental Programs (AEPs) in 1992 within the CAP. The history of comparable governmental intervention in the US dates back to even earlier times. The underlying economic concept of AEPs in the US and EU is similar to PES programs in Costa Rica and Mexico and overlaps considerably with many financial incentive approaches around the world. It appears that AEPs in the EU and US are only recently labelled as PES, research results on these programs and schemes are underrepresented in the international PES discourse. Only one paper by Wunder et al. (2008) compared selected case studies of governmental AEPs in the US and EU with PES case studies in developing countries. Except for this paper, we hardly found any literature emphasizing the potential to transfer lessons learnt and research results across countries and continents. Hardly any direct links were made between PES research in industrialized and developing countries, and if so, only on a very theoretical level (Jack et al., 2008; Sommerville et al., 2009). It appears that there is no direct and continuous exchange of practical PES experience and major lessons learnt, and no mutual learning between industrialized and developing countries. (Schomers and Matzdorf 2013)

One major difference between analysed national PES programs in developing and industrialized countries are the targeted ES. PES programs in developing countries mainly relate to reforestation and sustainable forest management practices to halt deforestation. National PES programs in industrialized countries target mostly ES produced on agricultural plots and working landscapes. PES schemes in developing as well as industrialized countries are frequently criticized for the lack of spatial targeting, lack in additionality and lack of distributing discriminative payments tied to opportunity costs. To improve both, environmental effectiveness and economic efficiency of PES, papers elaborating on innovations and technological changes in contract design and factors improving acceptance of PES received considerable attention. Interestingly and as highlighted above, the US and EU appear to have adopted a pioneering role in practical field experiments with diverse innovative contractual design features. Auctions are already an inherent part of the CRP in the US and are currently tested in model regions in Germany (combined with performance-based payments). Spatial targeting and benefit–cost targeting are realized within the CRP in the US and field experiments are being run in Europe. For developing countries, these contract design features are currently discussed only conceptually. Publications on practical implementation experiences for these contract design features in developing countries are still missing and most programs have not incorporated these so far. Countries planning to integrate any of these contract design characteristics in their existing national programs and

schemes might benefit substantially from considering experience and major lessons learnt elsewhere. (Schomers and Matzdorf 2013)

When comprising the US and EU's experience with governmental PES programs, it appears that the PES concept is neither as new and novel as frequently emphasized, nor does Costa Rica hold the pioneering role. Similarities between governmental PES programs in developing and industrialized countries are considerable.

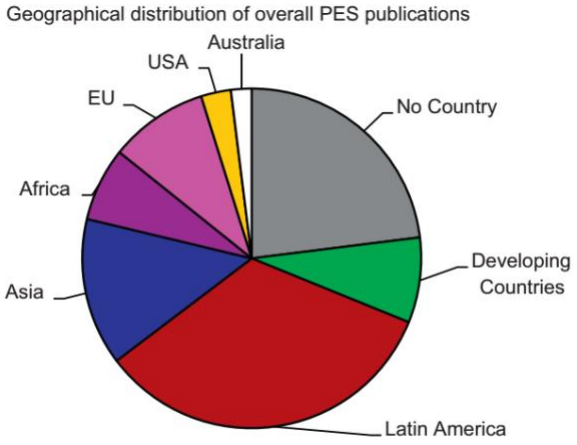


Fig. 2. Geographic distribution of overall PES publications (n=457). .
Source: own illustration.

Geographical distribution of overall PES publications. Taken from (Schomers and Matzdorf 2013)

Programs in the US and EU have been in place longer than most of the frequently published Latin American schemes. However, the former are hardly considered in the international PES literature as research is usually published under different terminologies. (Schomers and Matzdorf 2013)

USA

- The history of governmental incentives to promote conservation efforts in the US had been in existence longer than in the EU. In the 1930s, the fore-runner of the modern Conservation Reserve Program (CRP) protected soils and attempted to reduce certain crop production to prevent a surplus (Baylis et al., 2008). The 1985 Farm Bill broadened the US agricultural policy to integrate environmental and farm income concerns. Swampbuster and Sodbuster were integrated in the Farm Bill to halt conversion of wetland and highly erodible land to cropland (Baylis et al., 2008). Highly erodible land was taken out of production with the creation of the Conservation Reserve Program (CRP) (Dobbs, 2006). (Schomers and Matzdorf 2013)
- In 1996, the Environmental Quality Incentives Program (EQIP) was introduced in the Farm Bill and continuously modified in the 2002 Farm Bill with expanded financing and creation of the Conservation Security Program (CSP). EQUIP and CSP are AEPs for working lands and are essentially ''programs for the Federal government to purchase environmental services from agriculture'' (Dobbs, 2006: 16). CSP is the closest program to what 'multifunctionality' is in Europe (Dobbs, 2006). (Schomers and Matzdorf 2013)

EUROPE

- Within the EU, the discussion on PES as a mechanism to internalize externalities dates back to the 1970s and thus long before PES implementation in Latin America. The earliest article

found within this research was published in 1974, investigating ‘‘deficiency payments as compensation for the ecological services of agriculture’’ in Austria (Kaiser, 1974: 36). In 1988 Giessubel-Kreusch (1988) discussed the ‘‘stimulation of environmental protection through payments for positive environmental effects emanating from agriculture’’. Pevetz (1992: 886) discussed in 1992 the necessity of considering agricultural policy payments ‘‘not merely as a social aid but rather as a payment for genuine ecological services’’. (Schomers and Matzdorf 2013)

- In the 1980s, national PES programs were implemented and coordinated at the individual member state level (Baylis et al., 2006). In 1992, the MacSharry reforms resulted in a coordinated policy at the supra-national level of the EU (Baylis et al., 2008). (Schomers and Matzdorf 2013)
- The regulation EC 2078/92 introduced agri-environmental programs (AEPs) as a supplement to the Common Agricultural Policy (CAP) instruments across the EU member states (Baylis et al., 2008; Baylis et al., 2006). AEPs provide payments to farmers choosing to implement conservation efforts that improve the environment and/or maintain the countryside on a voluntary basis. (Schomers and Matzdorf 2013)
- Hampicke emphasizes that ‘‘in granting payments for ecological services according to new CAP regulations the trend towards rewarding positive environmental externalities has begun’’ (Hampicke, 1997: 253). However, the introduction of AEPs also induced a controversial discussion on whether AEPs are disguised production subsidies providing a more acceptable way of income transfer to farmers or rather an instrument ‘‘to encourage the optimal production of positive and negative externalities’’ (Baylis et al., 2006: 1). (Schomers and Matzdorf 2013)
- Farmers within the EU wanting to receive single farm payments from the first pillar need to comply with a certain minimum of Good Farming Practice (GFP). Beyond the GFP baseline additional payments in form of PES payments can be obtained on a voluntary basis (Baylis et al., 2008). AEPs consist of a variety of different agri-environmental schemes and measures. (Schomers and Matzdorf 2013)
- Depending on the agri-environmental scheme, both, the reduction of negative externalities (e.g. reduction of nitrate and pesticide pollution, conversion of intensive to extensive arable farming land etc.) and the provision of positive externalities are remunerated (Baylis et al., 2008). In the EU, approximately 20% of all farmland ‘‘is under some form of agri-environment program to reduce the negative impacts of modern agriculture on the environment, at a cost of about $1.5 billion’’ (Scherr et al., 2007: 381). Scherr et al. (2007: 381) emphasize that the ‘‘largest public biodiversity PES programs are the agri-environment payment programs in the United States and Europe, which compensate farmers for providing a variety of conservation-friendly land-use and management practices’’. (Schomers and Matzdorf 2013)
- AEPs often lack targeting on important areas. Consequently, unsatisfactory and inefficient results are obtained often (Uthes et al., 2010; Haaren and Bathke, 2008; Bertke et al., 2005; Groth, 2005). (Schomers and Matzdorf 2013)

Table 1: Best practices comparison.

Country	Stakeholders	Environmental problem/issue	PES Scheme
Finland	- The Ministry of the Environment - The Ministry of Agriculture and Forestry - The Finnish Environment Institute - The Forest Development Centre Tapio - Private forest landowners	To halt the ongoing decline in the biodiversity of forest habitats and species, and establish stable favourable trends in Southern Finland's forest ecosystems.	Landowners receive financial compensation for conserving areas and tax-free compensation for permanent protection. Compensation is based only on "opportunity cost", which means lost timber income.
Germany	- Private company Bionade - Trinkwasserwald®e.V. NGO - Forest landowners	The groundwater sources and the amount of water required, which is particularly high in urban centres, lead to a situation in many parts of Germany where ground-water resources are overexploited in order to ensure the drinking water supply.	The Bionade Corporation has covered most of the costs of converting the forest land from conifers to broadleaves, including the costs of ground preparation, nursery stock, planting and fencing, possible re-plantings, as well as on-going care and maintenance over several years.
Sweden	- The Swedish Environmental Protection Agency - The Country Administrative Board - The Forest Agency - Private forest landowners	To inspire landowners to protect valuable forests on their properties and inform them of which options are available for habitat protection.	Owners receive fixed-rate payments to compensate for limitations placed on their management in the interests of nature conservation. For habitat protection sites and nature reserves, owners receive full compensation plus an additional 25%.
Switzerland	- City of Basel (municipality) - Water consumers	Required changes in species composition and sustainable forest management for ensuring drinking water in canton Basel-Stadt.	Water consumers pay for the sustainable management of forests belonging to the city of Basel through an extra charge in their water bill.
Georgia	- Private company AgriGeorgia - Local landowners and farmers	Lack of capacity, deteriorating infrastructure and uncertain land tenure issues. Land abandonment, clearing for grazing, deforestation of windbreakers and illegal waste dumping.	Afforestation with traditional hazelnut plantations on land of local farmers, funded by AgriGeorgia and trainings on sustainable hazelnut plantation for a total of 2500 farmers.

Source: Table taken from (Viszlai et al. 2016)

7.2 PES mechanism

Evaluation of how to design a PES.

S	○ The success of PES depends on a good design of the PES scheme
W	○ Mechanisms of this kind promise much, but if poorly designed they can make things worse, not better. (Kinzig et al. 2011) ○ Others ES markets suffer from design flaws (the U.S. SO2 market described above) (Kinzig et al. 2011) ○ Poor targeting of ES is one of the main reasons for low economic efficiency and environmental effectiveness of PES (Robalino et al., 2008). (Schomers and Matzdorf 2013).
O	○ more understanding, evidence and testing is needed to better enable PES (Waylen and Martin-Ortega 2018) ○ more guidance, regulation and clarity to enable PES is needed to better enable PES (Waylen and Martin-Ortega 2018) ○ Many good practices examples of well-functioning PES schemes – basis for development of new ones. (Viszlai et al. 2016) ○ Potential mitigation measures for the risk factor 'external factors': **Flexibility and the scope for adaptive management should be incorporated** within PES schemes in order to accommodate external changes. Reasonably foreseeable external changes should be reflected in the baseline that will be used to gauge additionality. (DepEFRA 2013)

	○ Potential mitigation measures for the risk factor 'chance events': If the risk of interventions being undermined is high, **insurance** should be considered as part of the scheme. Under the Woodland Carbon Code, for example, the project land owner(s) must demonstrate their commitment to permanence by replanting or undertaking compensatory planting should woodland area be lost due to wind, fire, pests, diseases or development. (DepEFRA 2013) ○ **Use available funding streams** ○ Opportunities assessment: **An analysis of available funding streams to identify potential sources of finance to bolster or extend the scheme.** This reflects the Natural Environment white paper which argues that "Landscape scale action requires partners to pool resources and get the best possible value from them" and that "partnerships often draw together funding from National Lottery distributors, and from environmental charities, business, local authorities and communities". Examples of potential funding streams include the Catchment Restoration Fund for England, the Catchment Sensitive Farming Capital Grant Scheme, the Community Infrastructure Levy, EU funding programmes such as the European Regional Development Fund and INTERREG, EWGS, Heritage Lottery Fund, HLS and Section 106 monies collected by local authorities from developers. **PES schemes can also innovatively marry public and private money.** For example, SCaMP has successfully combined money from United Utilities with agri-environment scheme funding. In the first phase of the project United Utilities paid £8m for capital improvement works (grip blocking, restoring moorland, livestock fencing etc) while the government contributed £2.5m through ongoing agri-environment support, mainly through HLS payments. Box 9 provides a further example of a scheme combining public and private funds. In the future it might be possible to envisage the **creation of trust funds**, for example at the catchment scale, through which a wide range of public and private beneficiaries funded numerous enhancements or restoration projects designed to yield multiple ecosystem service benefits. (DepEFRA 2013) ○ PES could unlock **new or alternative funding opportunities**, at least for land-managers (Waylen and Martin-Ortega 2018) ○ PES are **potentially eligible for funding** from the new EU financial instrument on Natural Capital Financing Facility (NCFF). (Viszlai et al. 2016)
T	○ Other financing models (e.g. direct private payments). (Viszlai et al. 2016) ○ Issues related with **efficiency** of PES schemes -social inefficiency, lack of additionality, role of targeting. (Viszlai et al. 2016) ○ Is there any risk of **chance events** such as fres or the arrival of invasive species which might undermine the agreed interventions? Potential mitigation measures for the risk factor **chance events**: If the risk of interventions being undermined is high, insurance should be considered as part of the scheme. Under the Woodland Carbon Code, for example, the project land owner(s) must demonstrate their commitment to permanence by replanting or undertaking compensatory planting should woodland area be lost due to wind, fre, pests, diseases or development. (DepEFRA 2013)

How and when to apply a PES?

S	○ ES: ○ PES instruments feasible when **ES are relatively easily defined and measurable** (Waylen and Martin-Ortega 2018). ○ ES supply and demand: ○ **Clear ES supply and demand situation**. PES instruments feasible when the identification of ES provider/seller and consumer/buyer is clear (DepEFRA 2013, Viszlai et al. 2016), when there is certainty about how ES are supplied (Waylen and Martin-Ortega 2018), when management actions have clear effects on ES supply (DepEFRA 2013), when it is clear whose actions have the capacity to increase supply (DepEFRA 2013). ○ Property rights, public/private: ○ PES may replicate the incentive effects of markets in cases where the **provision of environmental public goods depends on private activity**. (Kinzig et al. 2011) ○ Appropriate cases ○ PES was expected to be **particularly suited** to **catchment management**, particularly for reducing diffuse pollution. However, beyond this there was not much agreement about the specific situations or challenges suited to PES. (Waylen and Martin-Ortega 2018) ○ **Nature conservation.** to improve environmental governance (Muradian et al. 2013), as supporting instruments of forest-related policies (Viszlai et al. 2016), to realise multifunctional forest under sustainable forest management (Viszlai et al. 2016), key Marked-Based Instrument for achieving

	environmental protection goals (Viszlai et al. 2016), to protect more types of places and ecosystems, especially in urban settings (Waylen and Martin-Ortega 2018), to encourage delivery of multiple benefits (Waylen and Martin-Ortega 2018), to improve sustainability in the longer-term (Waylen and Martin-Ortega 2018), additional instrument for nature management (not to replace existing approach such as the polluter pays principle) (Waylen and Martin-Ortega 2018).
W	○ Property rights, public/private: ○ often these mechanisms are imposed **without** due regard to the **properties** of the services they cover (Kinzig et al. 2011) ○ The importance of **property rights** and **their distribution** challenges the feasibility of PES. (Schomers and Matzdorf 2013) ○ **Ownership and tenure rights for forests are not always clear** and well identified (e.g. because of restitutions of forest land). (Viszlai et al. 2016) ○ **Market failure related to the "public good"** character of some ecosystem services. (Viszlai et al. 2016) ○ Appropriate cases ○ There are **many cases where payment systems will simply not be appropriate** (e.g., **where ES derive from lands or seas beyond national jurisdiction**). (Kinzig et al. 2011)
O	○ Appropriate cases ○ Crucially, PES schemes may provide the opportunity to contribute to **wider environmental and sustainability objectives**. (DepEFRA 2013) ○ Opportunities assessment: **A review of relevant policies, plans, programmes, strategies and initiatives to identify any wider environmental or sustainability objectives which the PES scheme might be designed to reflect and contribute to.** These might include Regional Flood and Coastal Committees (RFCC) programmes for flood and coastal risk management projects, Marine Plans, River Basin Management Plans, Shoreline Management Plans, catchment plans prepared in accordance with the Catchment Based Approach, Higher Level Stewardship (HLS) activities in priority areas, Local Plans prepared by local authorities, Neighbourhood Plans, green infrastructure strategies and biodiversity offsetting schemes. (DepEFRA 2013)
T	/

7.3 Participation

Who can/should participate in PES? What are conditions to participate in PES?

S	○ **Voluntary approach** for some PES schemes (Viszlai et al. 2016) ○ **PES could raise awareness** of the diversity of ways in which nature benefits society. PES was also noted as a means of **bringing together groups** not currently thinking about or working to manage the environment. (Waylen and Martin-Ortega 2018)
W	○ PES schemes do **not** generally allow **free exit and entry** (Kinzig et al. 2011) ○ Some ES markets are too "thin" (early carbon-offset markets involved **too few trades** for prices to track conditions) (Kinzig et al. 2011) ○ Is there a risk that payments might be targeted at the **wrong land or resource managers** because of shortcomings in the evidence base (for example, uncertainty as to whose land plays a critical role in water quality regulation)? (DepEFRA 2013)
O	○ Potential mitigation measures for the risk factor **payments targeted at the wrong land or resource managers**: If necessary, primary research should be undertaken to identify whose actions have the capacity to increase supply of the service in question. If identification proves problematic it might be possible to aggregate clusters of sellers for payment (for example, sellers across a catchment). (DepEFRA 2013) ○ Opportunities assessment: **A beneficiary analysis to identify all those who might benefit from the PES scheme**. This analysis will help proponents ensure **that all sources of potential funding have been explored** and will also **reveal any opportunities to expand the scope of the scheme to deliver further benefits**. In practice, identified beneficiaries can be analysed according to their number; their reliance on the service in question; the extent of the benefits they might secure through the intervention; their engagement with the issues in question; their willingness to participate in a scheme; and their capacity to contribute financially (or possibly in-kind, for example through the provision of expertise). (DepEFRA 2013) ○ **more awareness** of PES and engagement with the public and potential participants is needed to better enable PES (Waylen and Martin-Ortega 2018)
T	/

Issues related to behaviour, motivation, rights, responsibilities

S	○ **To force behaviour**. PES was worth trying where there were ‘‘no other alternatives” to engage or change land-manager behaviour. As such, much willingness to try PES seemed to be driven by frustration with the existing situation, compounded by fear of future reductions in resourcing for conservation. (Waylen and Martin-Ortega 2018)
W	○ The effects of payments in **inducing behavioural changes can vary substantially, depending on how the social meaning of such payments is constructed**. For example, **payments might enhance or <u>crowd out</u> intrinsic motivations to undertake an activity** (Frey and Jegen 2001; Bowles 2008; Charness and Gneezy 2009). (Muradian et al. 2013) ○ Payments do not always strengthen social and ethical motives, and they may actually **undermine such motives** in some situations (Titmuss 1970; Bowles 2008). (Muradian et al. 2013) ○ Is there a **risk of creating <u>perverse incentives</u>**? For example, land or resource managers paid to sequester carbon might plant non-native tree species which sequester carbon at a faster rate than indigenous species, yet broad swathes of non-native vegetation might lead to **detrimental impacts on biodiversity and contribute to wider problems** such as acidification, disease transmission or fire risk. (DepEFRA 2013) ○ Is there a **risk of the PES scheme being perceived as <u>unfair</u>**? For example, to maximise the provision of additional ecosystem services, the funds available through a PES scheme would be **best directed to those whose land or resources had the greatest potential to deliver additional services and away from those whose land or resources already provided the required services**. This could lead to payments being made to land or resource managers **who had not previously managed their land or resources in an environmentally-sensitive manner** and so **prompt accusations of unfairness**. (DepEFRA 2013) ○ **<u>Misplaced Rights and Responsibilities</u>**, “Polluter is paid”. By providing payments for particular actions, incentive programs specify or imply a set of rights and responsibilities that may change the way people perceive entitlements and appropriate actions. In the ecosystem services literature, researchers have noted that PES might shift our understanding of our rights and responsibilities towards ecosystems. (Chan et al. 2017) ○ **Motivational <u>Crowding Out</u>**, “Money breeds mercenaries”. Whereas we might hope that adding a monetary incentive simply adds to existing motivations for conservation, there is also a danger that the new monetary incentive provided by PES programs can undermine existing “intrinsic” or altruistic motivations. Much has been written describing this motivational “crowding out” in the context of PES (Vatn, 2010; Luck et al., 2012). (Chan et al. 2017) ○ **Project <u>Efficiency and Equity</u>**, “What about me?”. There is an inherent tension between structuring a program to achieve maximal conservation gain for the least money versus providing needed funds equitably across potential participants. (Chan et al. 2017) ○ **Burden of Monitoring**, “Cheating pays, so pay for policing”. If participants engage in a program primarily for monetary benefit, there is an unavoidable incentive for ES providers to cut corners or shirk responsibilities, which has led to costly on-ground monitoring to ensure that participants are doing as they should. (Chan et al. 2017) ○ **Top Down Prescription**, “Agency knows best”. Many PES programs fund particular actions on a one-size fits-all basis, which incurs the risk that would-be participants might recoil from such prescriptions due to conflicts with their own values or restrictions on their creativity and wisdom as stewards of the land. (Chan et al. 2017) ○ **Limited Applicability**, “A Coasean solution … for a non-Coasean world”. PES is also limited as a solution to environmental problems because they are only applicable to relatively rare cases (Wunder, 2013). Although Wunder points to several relevant requirements, much can be summed up by recognizing that PES—as ideally conceived—are effectively two-party negotiation solutions in a world where two-party problems are rare. (Chan et al. 2017) ○ Power, pressure groups: The resolution of “market failures” through payments tends to be seen as a technical matter. In practice, however, as with any other policy instrument, PES are **part of broader structures of power**. **Pressure groups might have a large influence** on the design of payment schemes, shaping their effectiveness and distributional outcomes (Boyce 2002; Corbera *et al.* 2009). (Muradian et al. 2013)
O	○ Potential mitigation measures for the risk factor **perverse incentives**: The scheme should incorporate measures to minimise the risk of creating perverse incentives, for example guidelines on the way in which ecosystem service outcomes should be achieved and maintained. (DepEFRA 2013) ○ Potential mitigation measures for the risk factor **PES perceived as unfair**: In establishing the baseline it should be apparent if levels of existing land stewardship are markedly different and whether this has any implications for the distribution of payments to sellers. If there is a marked discrepancy, the bar may need to be set higher in terms of the interventions that qualify for payment. Alternatively, the scheme could encompass the offer of advice and assistance to those land or resource managers perceived to be ‘lagging behind’. (DepEFRA 2013)

	○ **Pay Stewards and We All Contribute, Distributing Rights and Responsibilities Inclusively** [vs. Misplaced Right and Responsibilities] By paying for land managers to act as stewards rather than polluters, and by sharing the burden of payment across the supply chain, programs would distribute rights and responsibilities in a manner more conducive to sustainability. Tools for a new approach: payments for stewardship, not avoided pollution/degradation. (Chan et al. 2017) ○ **Co-pay (Sometimes in-kind), Complementing and 'Crowding In' Intrinsic Motivations** [vs. Crowding Out] By paying only a part of a participant's opportunity costs, a PES program might crowd in intrinsic motivations rather than crowd them out. Tools for a new approach: co-payments, in-kind payments (Chan et al. 2017) ○ **Forget Small-Scale Additionality; Focus on Efficiency via Attractiveness and Norm Change** [vs. Efficiency/Equity Dilemma] If programs were designed to pay participants for good behaviours (both past and future), individual parcels may not achieve additionality in the short term, but the program might be more efficient in the long run. Long-term success would stem from the activation and reinforcement of stewardship values (as above), and from building trusting relationships between ES providers and program officials via an inclusive program that feels fair. Tools for a new approach: rewards and support for *existing* good stewards. (Chan et al. 2017) ○ **Employ Intrinsic Motivations and Peers to Reduce Monitoring Needs** [vs. Burden of Monitoring] ES provider incentives to cheat are greatly reduced when providers make a publicly conspicuous commitment. The design of co-payments, which intend to ensure that the program is attractive only to those with intrinsic incentives, thereby greatly reduces the individual motivation to cheat. Tools for a new approach: peer monitoring; landowner-identified valued activities (e.g. via reverse auctions). (Chan et al. 2017) ○ **Invite Place-based Solutions, Inspiring Agency** [vs. Top Down Prescription] If program officials do not dictate appropriate stewardship actions, but rather invite ES providers to propose what they would like to do (that contributes to specified environmental outcomes), there's an immediate inspiration of the creative agency of producers as stewards. Tools for a new approach: landowner-identified valued activities (e.g. via reverse auctions); participatory program design. (Chan et al. 2017) ○ **Include Funders Seeking to Mitigate Their Impacts, Thus Involving Parties Throughout the Supply Chain** [vs. Limited Applicability] Whereas traditional PES programs are designed for private or public beneficiaries to secure private or public benefits, a program designed to enable funders to mitigate impacts and/or pay "user fees for nature" could potentially involve large portions of supply chains. Tools for a new approach: new institutions with calibrated funding duties (e.g. offsets) to engage *all* supply chain actors. (Chan et al. 2017) ○ **Motivated buyers**. As with all exchanges, PES is driven by demand: by the perceived scarcity of ecosystem services. […] Because many services are public goods, **demand can be created through regulation or subsidies**. This prevents free-riding and overcomes the collective action costs of organizing diffuse beneficiaries. It is thus no surprise that the largest PES programmes are all based on **transactions mandated by compliance PES driven by regulation (such as mitigation banking)** or **government-financed PES (such as watershed PES financed through water utility bills or government payments)**. […] (Salzman et al. 2018) ○ **Motivated sellers**. If PES payments are to provide or ensure service provision, then landowners need to be paid, and their behaviour must be sufficient to provide the desired service. Moreover, the size of the payment to landowners must be competitive with the opportunity costs. In many settings, the revenue streams from PES will be inadequate on their own to change landowners' behaviour and may need to operate **in tandem with regulation or other strategies. A key challenge for subsidy programmes lies in identifying those landholders that are most important for service provision.** This requires an assessment mechanism to ensure the funds are spent most efficiently. Many subsidy programmes, however, do not condition payments on service provision capacity, either because of the transaction costs or concern over achieving a dual goal of poverty alleviation. (Salzman et al. 2018) ○ **Enhancing acceptance of PES Instruments.** Acceptance of PES by relevant stakeholders is considered important due to the voluntary nature of PES deals—in particular on behalf of ES providers. Acceptance relates mostly to factors influencing scheme uptake, acceptance of and adhering to the rules of the game. Acceptance impacts on economic efficiency and environmental effectiveness. Interestingly, Sommerville et al. 2010) find that the payment is not always the key driver determining acceptance and compliance. Rather, payments increase acceptance of monitoring, which in turn leads to more compliance as the risk of being caught and fined is increased. The perceived fairness and the distribution of benefits and costs also influence acceptance of payments. Chen et al. (2009) observe that next to payment, social norms at the neighbourhood level, program duration, household economic and demographic conditions, farm feature and personal characteristics such as age, gender and education also influence PES program re-enrolment in China. Correspondingly, Zbinden and Lee (2005) find that farm features, household economic and demographic conditions significantly influence participation in the Costa Rican program. Gong et al. (2010) analyse the institutional factors beyond the pure financial incentive and find that PES needs to take account of the institutional environment, such as the formal and informal rules that are in

	place. If the institutional structure fails to guarantee low transaction costs, clearly defined property rights and build strong social capital, participation in the schemes remains low despite available financial surpluses. Also, Kosoy et al. (2008) demonstrate that the institutional environment affects participation. Participation is determined, next to financial incentive, by procedural rules, stakeholder interaction and individual characteristics. The ability to account for and exhaust context-related factors and to successfully incorporate these into scheme design influences participation and thus success or failure of PES schemes (Corbera et al., 2007). (Schomers and Matzdorf 2013)
T	/

7.4 Transaction payment

How much should be paid? How to calculate this amount? What should be included?

S	○ Spatial targeting improves both, environmental effectiveness and economic efficiency by targeting payments to most vulnerable, degraded or suitable lands. Consequently, ES are either provided at lower costs than elsewhere (Uthes et al., 2010) and/or payments are targeted to parcels with highest degradation risk and thus to areas where they will have the largest impact (Robalino et al., 2008). Targeting payments to areas where they are most needed (Sierra and Russman, 2006) increases environmental effectiveness. (Schomers and Matzdorf 2013)
W	○ PES schemes do **not** generally allow iteration toward a **clearing price** (Kinzig et al. 2011). (The clearing price is the price of goods or services that exists when the quantity supplied is equal to the quantity demanded. In economics, market clearing is the process by which, in an economic market, the supply of whatever is traded is equated to the demand, so that there is no leftover supply or demand.) ○ **prices** they generate are **not directly responsive** to changing conditions (Kinzig et al. 2011) ○ "**trying to sell nature** to save it" market-based approaches. practice of **reducing** all the functions of nature to **exchange value** (Muradian et al. 2013) ○ Most of the compensation mechanisms in the PES schemes are **based only on "opportunity cost", which means lost timber income**. (Viszlai et al. 2016) ○ It is **hard to measure nature values and ecosystem services**. Each group of ecosystem service **require specific valuation methods**. (Viszlai et al. 2016) ○ Valuation methods **could introduce bias** depending on assumptions and available (local) data. (Viszlai et al. 2016) ○ **Providing ecosystem services without pricing**. (Viszlai et al. 2016) ○ **Other financing models** (e.g. direct private payments). (Viszlai et al. 2016) ○ The **transactions costs** and means to reduce these, challenge the feasibility of PES. (Schomers and Matzdorf 2013)
O	○ for ES that may benefit from payment systems, **how we pay is critical**. **Payment schemes should capture all effects of ecosystem management** (e.g., affecting multiple ES). They **should consider scale** (e.g., how country-to-country payments translate into within-country payments to landholders) and **lead to measurable, verifiable outcomes** that go beyond what would have happened in the absence of the payment scheme. (Kinzig et al. 2011) ○ **Alternative indicator for price. Where it is not possible to use prices as indicators** of the scarcity of ESs we need **other metrics**. **Physical indicators of the state of ecosystems** need to be integrated into national income and product accounts and **made comparable to other measures of income**. (Kinzig et al. 2011) ○ The outcomes will depend on a variety of factors, including the **magnitude of the payment**, whether it is **individual or collective**, **local notions of fairness**, and the **psychological, cultural, and social embeddedness of the concerned behaviour** (Gneezy and Rustichini 2000; Fehr and Falk 2002). (Muradian et al. 2013) ○ **Performance-based payments** (also 'payments by results', 'result-oriented payments', 'outcome-oriented payments', 'outcome-based payments' or 'success-oriented remuneration) relate payments to actual ES provision. In contrast to payments prescribing certain actions or inputs, performance payments are likely to improve economic efficiency and environmental effectiveness. Whereas centrally prescribed land use practices are often not tailored and adapted to local needs, performance payments trigger local knowledge and provoke active and innovative land use practices (Groth, 2005). Land stewards will ''find the best way of combining inputs in their particular location to meet the overarching goals of generating a desired level of environmental services'' (Zabel and Roe, 2009: 126). Service providers commonly know more about needed inputs and land use practices, enabling ES supply at lower costs. Performance payments help to reduce asymmetrically distributed information and improve the cost-effectiveness of ES provision. However, the risk of service provision is transmitted to the service provider, who might

	consequently charge a risk premium that ultimately increases the payment again (Zilberman et al., 2008). (Schomers and Matzdorf 2013) ○ **Performance payments** often require only one final inspection visit (Hoft et al., 2010), thus decreasing overall monitoring costs. However, payments must be tied to observable and therefore often distorted indicators (Zabel and Roe, 2009). Consequently, **reliable indicators** need to be developed; otherwise payments might be distributed despite missing ES provision. Hasund (2011) demonstrates a methodology for indicator development and Hoft et al. (2010) evaluate newly determined vegetation indicators for grazing activities. Zabel and Roe (2009) discuss the economic theory of performance payments and briefly highlight and compare four different payment approaches with various briefly illustrated field examples. Zabel and Roe (2009) disclose that performance-based PES schemes do exist around the globe, many of them being however very small. Performance payments appear to be well researched in **Germany**, where **practical experiments for agricultural biodiversity** are already in place (Bertke et al., 2003; Hoft et al., 2010). Zabel and Engel (2010) provide a framework to establish a performance-based wildlife conservation scheme in India. Their framework is based on "pioneer performance payment scheme for carnivore conservation which is implemented in Sweden" (Zabel and Engel, 2010: 406) and aims at transferring PES experience from an industrialized to a developing country setting. Skutsch et al. (2011) highlight that carbon projects under REDD will be performance-based PES schemes. (Schomers and Matzdorf 2013) ○ **Auctions** (also 'reverse auction' or 'procurement auction') are a contractual design feature that invites potential ES suppliers to submit price offers at which he is willing to sign a PES contract. Bids must be competitive as only reasonable offers might be contracted. Auctions help to reveal private willingness-to-accept (WTA) and private opportunity costs (Ferraro, 2008). It is a mechanism to enhance economic efficiency and environmental effectiveness of PES contracts as informational asymmetries and consequently informational rents are reduced. The cost-revelation mechanism allows for cost savings for the ES buyer as payments are minimized (Pascual and Perrings, 2007; Ferraro, 2008). Given a fixed budget, auctions allow for the maximization of ES conserved. Auctions are used successfully within the Conservation Reserve Program (Baylis et al., 2008) and are currently implemented and tested in field experiments in Germany (Bertke et al., 2008), in Indonesia (Leimona et al., 2009; Jack et al., 2009) and Australia (Rolfe and Windle, 2011). Furthermore, auctions are discussed and recommended for carbon payment schemes in the Amazon (Boerner et al., 2010; Wertz-Kanounnikoff et al., 2008) and to be implemented in Mexico's national PES program (Alix-Garcia et al., 2009; Munoz-Pina et al., 2008). A pilot project in Germany currently tests the combination of performance payments with auctions. This is assumed to further enhance economic efficiency (Groth, 2005; Bertke et al., 2008, 2003). However, Schilizzi et al. (2011) show that combining auctions with performance payments can be counterproductive in terms of expected ES output produced, i.e. auctions can reduce environmental effectiveness. Southgate and Wunder (2009) discuss the use of Vickery auctions to reduce strategic behaviour and transaction costs and thus to increase economic efficiency of PES contracts. In a Vickery auction, winners do not receive their winning bid, but rather the amount offered by competitors they have underpriced, i.e. winners receive a payment that is slightly above their bid. Vickery auctions are assumed to discourage exaggerated bids, as these only increase payments to competitors. (Schomers and Matzdorf 2013) ○ **Metrics**. Because PES is, by definition, an exchange of value for services, how the service should be measured is of prime importance. […] **Wetland and stream mitigation programmes** also provide low-cost metrics, defining **credits in terms of area of wetland and linear stream habitat lost/restored, often with additional quality weightings**. These are proxies, however, and it remains contested how accurately they capture provision of services13. […] **The choice of metrics presents a tension: easily assessed metrics reduce transaction costs and aid in exchanges, but they risk missing what really matters and may not, in fact, align with conservation goals.** More rigorous metrics, by contrast, may accurately capture service values but be so unwieldy that transaction costs become prohibitive13. (Salzman et al. 2018) ○ **Low-transaction-cost institutions**. As a practical matter, a PES programme requires a **set of discrete buyers to pay** for the service and a **set of discrete sellers to be paid**. Equally, there must be an **efficient means of exchange to collect and distribute funds**. This is fundamental to the success of many watershed PES programmes. **Water utilities already exist to collect fees from beneficiaries.** No individual negotiation is necessary, so the transaction costs are greatly reduced. […] With these factors in mind, it becomes **obvious why government financed watershed PES has scaled up as a successful strategy in terms of value, growth and geographical reach**. The apparent relationship between watershed protection and water quality motivates buyers. Upper-watershed landowners are easily identified and can be paid to change their management practices. The clear metrics for implementation are based on development restrictions and subject to low-cost monitoring. Additionally, **water utilities are already in place to collect fees from beneficiaries and pay suppliers**. Userfinanced biodiversity PES, at the other extreme, generally lacks all of these attributes. (Salzman et al. 2018)
T	○ Providing ecosystem services **without pricing**. (Viszlai et al. 2016)

	○ **Market failure** related to the "public good" character of some ecosystem services. (Viszlai et al. 2016) ○ Payments **do not always strengthen social and ethical motives**, and they **may actually undermine such motives** in some situations (Titmuss 1970; Bowles 2008). (Muradian et al. 2013) ○ Is there a risk that changes in **external factors** (for example, rising commodity prices) might undermine the scheme? (DepEFRA 2013)

7.5 Review of effectiveness of PES

A literature review of the effectiveness of PES by (Salzman et al. 2018) reveals that spending money, in and of itself, does not guarantee provision of valuable ecosystem services. For most programmes, we simply do not know their effectiveness. Research has provided very mixed results when examining the effectiveness of forest PES and watershed PES, as well as the programmes' impacts on social welfare. Like most conservation programmes, PES schemes are rarely established with a rigorous evaluation of effectiveness in mind. Researchers studying them at a later date have often lacked baseline data, control areas or randomized design, making it difficult to evaluate counter-factuals—what would have happened without a PES programme? Moreover, much of the literature has relied on case studies, introducing problems of selection bias. The scant impact evaluation of PES in the field prevents meaningful analysis of the programmes' effectiveness or efficiency, hinders comparisons across programmes and frustrates understanding the trade-offs between environmental, economic and social/political goals that are particularly important in PES programmes that promote multiple benefits.

Outcome of the PES?

S	/
W	○ Often the **science is uncertain or ignored** (PES schemes for water supply through afforestation face **uncertainty about the net effects** of changing forest cover) (Kinzig et al. 2011) ○ over-reliance on payments as win-win solutions might lead to ineffective outcomes (Muradian et al. 2013) ○ Is there a risk that the interventions will be too short-lived to deliver the necessary ecosystem service benefits (a lack of **'permanence'**)? (DepEFRA 2013) ○ Is there a risk that the land or resource management **interventions** proposed will **fail** to yield the anticipated ecosystem services leading to diminished confidence on the part of buyers? (DepEFRA 2013)
O	○ Potential mitigation measures for the risk factor lack of **permanence**: The scheme should incorporate safeguards to ensure the permanence of the interventions where possible. Under the Woodland Carbon Code, for example, the project land owner(s) must commit to a permanent land-use change to woodland and to maintain the project area as a permanent woodland carbon sink. Generally speaking, permanence can be encouraged through including **'no regrets'** interventions within the PES scheme. These are measures which, from a seller's perspective, are 'worth doing anyway' (for example, to save on utility costs). (DepEFRA 2013) ○ Potential mitigation measures for the risk **factor interventions fail**: If necessary, primary research should be undertaken to demonstrate the links between management interventions and ecosystem service outcomes ('cause-and-effect'). Ultimately, much will depend on the degree of uncertainty which buyers will tolerate. If the level of uncertainty is reasonably small, it may be possible to defer a more conclusive demonstration of cause-and-effect to the monitoring stage. (DepEFRA 2013)
T	/

Issues of externalities (leakage), multiple ES, unwanted feedbacks, leakage and trade-offs

S	/
W	○ Few schemes address multiple ES, yet **interdependence between services generates unwanted feedbacks**. Incentives that encourage production of one service may have adverse effects on others. Where ES are jointly produced, paying for only one service can be as damaging as paying for none. (Kinzig et al. 2011) ○ Generation of **negative externalities**. (Viszlai et al. 2016)

	○ Is there a risk that increasing the provision of an ecosystem service in **one area** will lead to pressure on ecosystem services **elsewhere (leakage)**? For example, payments for enhanced service provision on one parcel of land might provide the income needed to begin harmful activities on another or an adjacent land use may be intensified to compensate for reduced output in the area covered by the PES scheme. (DepEFRA 2013) ○ Is there a risk that land or resources will be managed to increase the level of a particular ecosystem service at the expenses of others (leading to **trade-offs** in service provision)? (DepEFRA 2013) ○ **New Externalities**, "A cure for every ill, an ill for every cure". The danger with any new market or system of incentives intended to address environmental externalities is **that it will itself yield actions with unintended consequences in the form of new externalities**. (Chan et al. 2017)
O	○ Potential mitigation measures for the risk factor **leakage**: Ensure that arrangements for monitoring extend beyond the geographic boundaries of the PES scheme in order to assess the magnitude of any leakage and consider any potential conditions of contract that might be introduced to minimise leakage. (DepEFRA 2013) ○ Potential mitigation measures for the risk factor **trade-offs**: The scheme should incorporate safeguards to minimise the risk of trade-offs. For example, new woodland certified under the Woodland Carbon Code must be managed in accordance with the UK Forestry Standard, including all the environmental and social aspects of this. (DepEFRA 2013) ○ **Reward Stewardship, Not Particular Actions** [vs. New Externalities] By rewarding stewardship instead of particular pre-defined actions or outputs, programs could close the loopholes that inevitably arise with any fixed metric for payment, thus reducing the risk of new externalities. Tools for a new approach: multiple ecosystem service targets; flexibility in supported activities. (Chan et al. 2017)
T	/

8 APPENDIX 2. Notes from the French workshop

A similar series of workshops was organised in France on the 12th of Juin 2019, at the Métropole Européenne de Lille (MEL). There were 47 participants present.
The morning consisted of a series of presentations by:

- Alain Detournay (MEL)
- Christiane Bouchart (MEL)
- Katrien Van der Bies (UA)
- Marc Parmentier (BRGM)
- Jean Prygiel (AEAP)
- Olivier Prevost (DREAL)
- Coline Grabinksi (DREAL)
- Cécile Hérivaux (BRGM)

In the afternoon the participants were split into 2 groups, each of them did 2 workshops (in total 4). The aim of the workshops was mainly to make people reflect on EBA measures and the potential to develop a PES scheme for such measures in the region Hauts-de-France. The targeted audience was wide covering multiple institutional levels.

After the workshop, the participants were sent a document with the notes gathered from the different workshops. The main conclusions from the SWOT-analysis in Flanders were also included in the document and complemented with elements gathered during the workshop in France.

8.1 Atelier 1a - Cartographie des acteurs d'un système Paiement Services Ecosystémiques

Animateurs : animateur du matin, Katrien Van der Biest, Olivier Prévost

Similar to the second Flemish workshop organized in Brussels on the 23rd of November 2018

Achète

- Agriculteurs
- Eleveurs
- Sylviculteurs
- Collectivités
- Acteurs du tourisme nature, activités plein air
- Producteurs d'eau
- Distributeur AEP
- Particuliers
- Pêcheurs
- Chasseurs
- Intercommunale GEMAPI
- Outils industriels
- VNF

Soutien

- Agence de l'eau
- Association environnementale
- Organismes d'animation ONF, PNR
- Elues
- Chambre d'agriculture
- Union Européenne
- AFB

Contrôle (c) et règlementation (r)

- Services de l'état – police de l'eau (c)
- Association environnementale (c)
- Union Européenne (c, r)
- AFB (c, r)
- Pouvoirs publics (r)

Vend

- Agriculteurs
- Particuliers
- Chasseurs
- Sylviculteurs
- VNF
- Collectivité

Intermédiaire

- Agriculteurs
- PNR (Parcs Naturels Régionaux)
- SAGE
- CPIE
- AEAP
- Notaire
- Wateringue
- Wikipedia (références, propagation)

Savoir

- Bureaux d'étude
- Chambre Agriculture
- Chercheurs
- Spécialistes GIS et biodiversité
- Association environnementale
- ONGE
- AFB

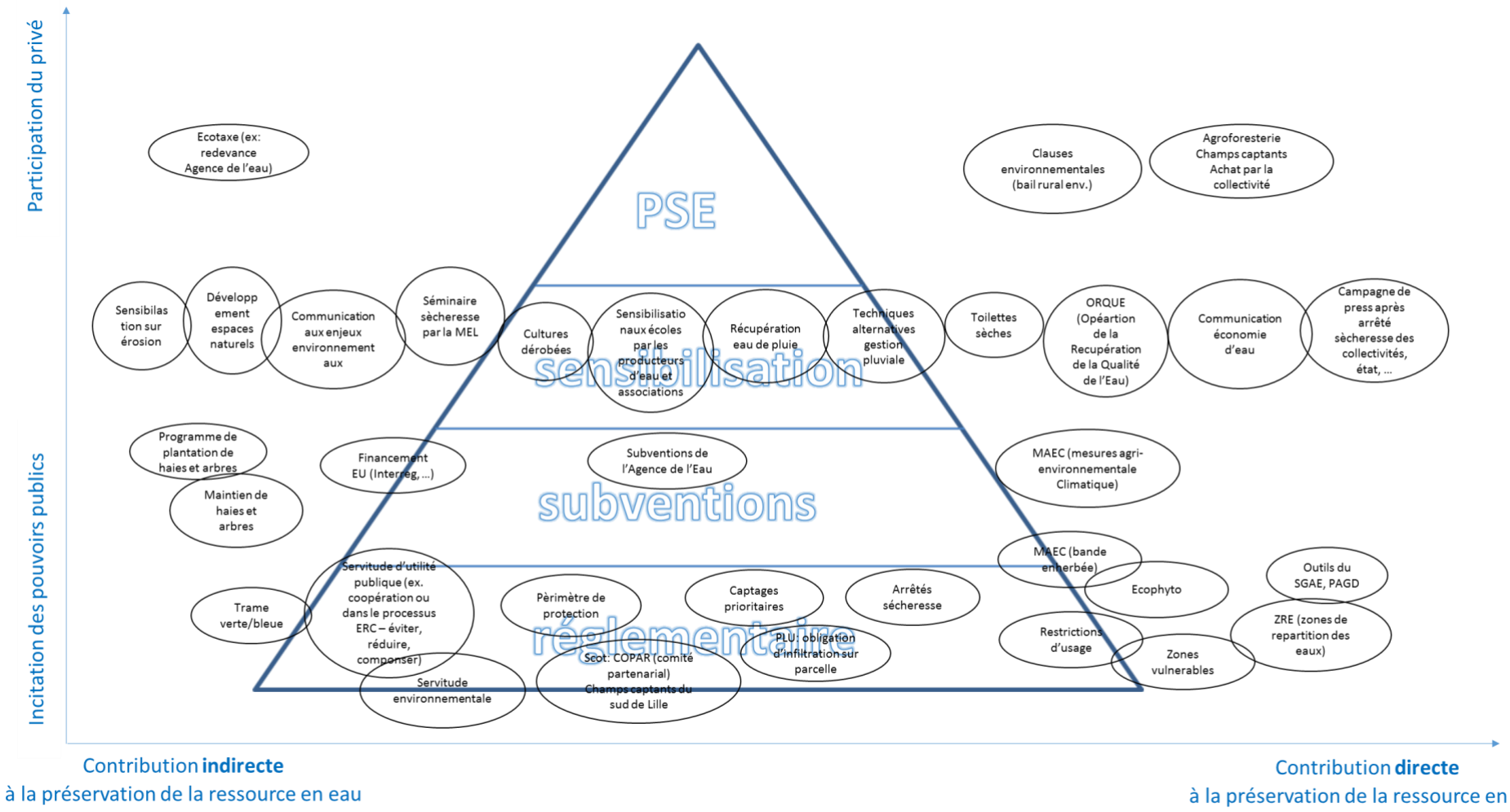
8.2 Atelier 1b - Cartographie des mesures en place sur le territoire

Animateurs : animateur du matin, Katrien Van der Biest, Olivier Prévost

Similar to the second Flemish workshop organized in Brussels on the 23rd of November 2018

Plus en haut de la pyramide (=plus proche du but de PROWATER), plus grand est l'engagement des personnes/instituts impliqués dans le schème (participation privé). Cet engagement dépasse les obligations imposées par la législation ou la politique (obligatoire), ou encouragées p.e. à travers de subsidies (volontaires). Les mesures d'adaptation que les instruments existants ne couvrent pas se trouvent plus haut dans la pyrimade: des win-wins (co-benefits) et le PSE (plus d'initiative et d'engagement : création de bénéfices communs à travers d'investissements privées). Plus vers le droit (=plus proche du but de PROWATER), plus l'instrument/mesure est approprié pour l'adaptation à la sècheresse (restauration de l'infiltration et rétention d'eau). Vers le gauche les instruments avec des bénéfices indirectes pour la restauration du système hydrologique.

Le but du workshop est d'identifier des opportunités pour développer un PSE. Y ont-t-ils des manques dans le paquet de mesures existantes?


Participation du privé
Incitation des pouvoirs publics
Ecotaxe (ex: redevance Agence de l'eau)
PSE
Clauses environnementales (bail rural env.)
Agroforesterie Champs captants Achat par la collectivité
Sensibilas tion sur érosion
Développ ement espaces naturels
Communication aux enjeux environnement aux
Séminaire sècheresse par la MEL
Cultures dérobées
Sensibilisatio naux écoles par les producteurs d'eau et associations
Récupération eau de pluie
Techniques alternatives gestion pluviale
Toilettes sèches
ORQUE (Opéartion de la Recupération de la Qualité de l'Eau)
Communication économie d'eau
Campagne de press après arrêté sècheresse des collectivités, état, ...
sensibilisation
Programme de plantation de haies et arbres
Maintien de haies et arbres
Financement EU (Interreg, ...)
Subventions de l'Agence de l'Eau
MAEC (mesures agri-environnementale Climatique)
subventions
MAEC (bande enherbée)
Ecophyto
Outils du SGAE, PAGD
Trame verte/bleue
Servitude d'utilité publique (ex. coopération ou dans le processus ERC – éviter, réduire, compenser)
Pèrimètre de protection
Captages prioritaires
Arrêtés sécheresse
Restrictions d'usage
ZRE (zones de repartition des eaux)
réglementaire
PLU: obligation d'infiltration sur parcelle
Zones vulnerables
Servitude environnementale
Scot: COPAR (comité partenarial) Champs captants du sud de Lille
Contribution indirecte à la préservation de la ressource en eau
Contribution directe à la préservation de la ressource en eau

8.3 Atelier 2 - Matrice des forces et faiblesses du territoire pour la mise en place de mesures de paiement des services écosystémiques

Animateur : inconnu

Forces du territoire pour la mise en place de systèmes PSE

Ce que le territoire fait déjà bien, les éléments qualitatifs qui distinguent le territoire des autres territoires, les ressources internes valorisables et les acteurs compétents, les ressources du territoire…

- Gouvernance multi-acteurs déjà en place
- Concertation des acteurs
- Ingénierie
- Plan d'adaptation au changement climatique
- Prise de conscience environnementale
- Conseil de l'eau
- ORQUE
- PCAET – santé environnementale

Faiblesses du territoire

Ce qui manque au territoire, ce que les autres territoires font mieux, les contraintes du territoire en ressource et moyens,…

- Héritages industriels (pollution etc), nombreux sites pollués orphelins
- Qualité des eaux
- Manque de recul sur le sujet (temps)/monétarisation
- Pression économique
- Expansion urbaine
- Contexte foncier, tension
- Contexte foncier pour l'agriculture, absence d'aide financière (aux agriculteurs)
- Communication
- Effort de reconquête – obligation des propriétaires

Opportunités : avantages externes favorisant l'émergence de paiement de services écosystémiques

Des conditions climatiques prouvant la nécessité de tels outils, …

- Education et formations
- Succession de sècheresse, troisième épisode de sècheresse
- Prise de conscience du changement climatique
- Création de filières
- Changement politique
- Analyse de l'impact social du PSE/santé publique (ex : SROI
- Communication
- Rémunération du particulier ou consommateur → inégalités ?
- Nécessité d'établir le diagnostic du territoire faisant état des pratiques actuelles des acteurs → rémunération adaptée au service rendu en fonction de l'état

Menaces : contraintes externes rendant difficile l'émergence de l'approche PSE

La complexité du sujet, la difficulté à l'objectiver et à mesurer les effets, la concurrence des usages du foncier, le manque de vision à long terme, la mauvaise image du sujet, le risque de monter un tel système financier…

- Impacts du changement climatique
- Manque d'euros
- Perception comme un droit à polluer/dégrader
- Risques d'évolutions de la filière agricole
- Connaissances scientifiques sur le long terme
- Solidarité des territoires – plusieurs contributeurs, comment ?
- Manque de valorisation des compartiments vertueux, sentiments d'injustice. Que financer : la préservation et les compartiments vertueux ou la reconquête ?
- Rémunération du particulier ou consommateur → inégalités ?
- Qui finance, quelle garantie ?
- Implication de la sphère publique pour être garant de l'intérêt général (privatisation): partage politique, organisation adéquate
- Au-delà des mandats politique
- Le nouveau système mis en place pourrait déstabiliser l'ancien système – déséquilibre du système
- Changement politique

8.4 Atelier 3 – Les synergies de préservation des eaux souterraines dans un territoire

Animateur : Cecile Hérivaux

L'objectif de l'atelier est une réflexion sur la mise en œuvre potentielle d'instrument de type PSE sur des territoires à enjeu EAU. L'atelier a créé un débat sur la pertinence de ce type d'instrument et une réflexion sur les conditions préalables à la mise en œuvre, identification des avantages, des risques etc. L'atelier se déroulait en 6 petit groupes, réfléchissant sur des territoires contrastés. Chaque groupe réfléchit sur 6 questions.

Groupe 1

1) Un instrument de type PSE vous semble-t-il adapté pour la protection de ce type de territoire ?

Contrat entre propriétaires forestières/usagers à l'échelle du BV.

2) Quel forme prendrait-il ? Qui seraient les acteurs impliqués ?
- Contrat
- ONF, CRPF, propriétaires, usagers, AEAP + collectivités + état + producteurs d'eau
- PNR

3) Quels sont les freins potentiels à la mise en œuvre de ce type d'instrument (réglementaires, techniques, institutionnels, culturels) ?
- Financiers (montant) qqx1000€/ha/an ?
- Tourisme

4) Quels sont les avantages potentiels ?

Préservation du couvert

5) Y a-t-il des risques associés ?

Rupture du contrat ou TA.

6) Quelles sont les options alternatives ?

Classement de bois sur PLU. Création d'une taxe ou utilisation d'une taxe réserve naturelle

Achat de la forêt par collectivité.

Groupe 2

1) Un instrument de type PSE vous semble-t-il adapté pour la protection de ce type de territoire ?

Une protection réglementaire

2) Quel forme prendrait-il ? Qui seraient les acteurs impliqués ?

Besoin de bonne gouvernance (financée par la ville en amant)

Besoin de scientifiques

Chasseurs/pêcheurs : achète, vend ?

3) Quels sont les freins potentiels à la mise en œuvre de ce type d'instrument (réglementaires, techniques, institutionnels, culturels) ?

Peur de perdre maitrise de son environ

Remarque : nul n'est prophète en son pays, aller vers des exemples ailleurs

4) Quels sont les avantages potentiels ?

-

5) Y a-t-il des risques associés ?

Incertitudes sur le future

Les centres contaminées par de dioxines polluent les eaux karstiques.

La ville se développe trop et pompe trop d'eau.

Rupture du contrat ou TA.

Dépasse pas trop sinon, le soufflet se dégonfle et démotivatrion.

6) Quelles sont les options alternatives ?

Engagement, convention entre 2 collectivités (sur l'affectation 'soutenable' des aides finacières ou non-financ). Win-Win. SCOT, PLOI, PCAET

Lien avec PCAET, PNR

La ville devrait s'engager à limiter son développemnt et so consomation en eau

Crédits carbon → autre source de financement possible. Si forêt à plus haut naturalité → points de carbon = cobénéfice.

Groupe 3

1) Un instrument de type PSE vous semble-t-il adapté pour la protection de ce type de territoire ?

-

2) Quel forme prendrait-il ? Qui seraient les acteurs impliqués ?

Système de quoter par type d'activités : chasseurs, pêcheurs, producteurs de bois, agriculteurs. Engagement de différents acteurs.

3) Quels sont les freins potentiels à la mise en œuvre de ce type d'instrument (réglementaires, techniques, institutionnels, culturels) ?

Bénéficiaire de la ressource du territoire, comment impliquer ?

4) Quels sont les avantages potentiels ?

Développement d'un parc urbain

5) Y a-t-il des risques associés ?

Risques financiée sur la partie privée ?

Si satisfaction des besoins de la ville ailleurs, qui de la sauvegarde ?

6) Quelles sont les options alternatives ?

Réglementaires pour …

Développement de la ville à mesure et conventionner pour limiter

Groupe 4

1) Un instrument de type PSE vous semble-t-il adapté pour la protection de ce type de territoire ?

Qui s'il intègre 1 moyen de récompenser les compartiments vertueux existants

2) Quel forme prendrait-il ? Qui seraient les acteurs impliqués ?

Récompenser maintien des pratiques existantes vertueux.

L'ensemble des usagers (pêcheurs etc.). Agence de l'Eau, Acteurs du tourisme, Producteurs d'eau, collectivités voisines

3) Quels sont les freins potentiels à la mise en œuvre de ce type d'instrument (réglementaires, techniques, institutionnels, culturels) ?

Prise de connaissance de l'intérêt de préserver pour générations futures.

Précision du cadre réglementaire

Manque de recul (évaluation)

4) Quels sont les avantages potentiels ?

-

5) Y a-t-il des risques associés ?

Solidarité/cohésion entre les acteurs impliquées mise à mal

6) Quelles sont les options alternatives ?

Mesures complémentaires (toilettes sèches, etc)

Creuses contexte réglementaire

Charte bonnes pratiques (promeneurs)

Groupe 5

1) Un instrument de type PSE vous semble-t-il adapté pour la protection de ce type de territoire ?

50% public = financements état/50% consommateurs

Bonne gestion forestière encouragée par PSE

2) Quel forme prendrait-il ? Qui seraient les acteurs impliqués ?

Part permis pêche et chasse

Consommateurs d'eau actuels

3) Quels sont les freins potentiels à la mise en œuvre de ce type d'instrument (réglementaires, techniques, institutionnels, culturels) ?

Echelle du PSE = BV, … national

4) Quels sont les avantages potentiels ?

Concerne l'ensemble des acteurs du territoire (aussi ceux non concernés par environnement)

5) Y a-t-il des risques associés ?

Pollution continue

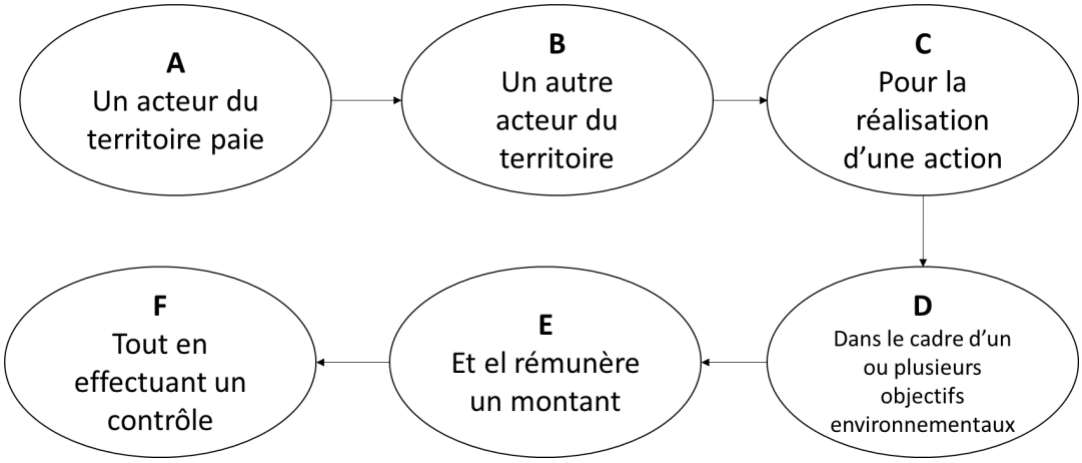
6) Quelles sont les options alternatives ?

Planification urbanisme (PLUI, SCOT, …)

8.5 Atelier 4 – Etude de cas : développer un business model

Animateur : Mélanie Lotte

L'équation PSE :



Proposition 1

A : MEL en tant que producteur d'eau potable avec le soutien de l'AEAP
(intermédiaire : accompagne et conseille la MEL sur l'écriture des mesure et les agriculteurs sur les mesures adaptées à leur exploitation)
B : les agriculteurs du territoire
C : changement de pratiques culturales au faveur de l'infiltration des eaux, exemple : semences tolérantes à la sècheresse, changement pneus, …. Des mesures plus fortes qui sont proportionnellement rémunérées
D : service d'approvisionnement en eau → améliorer la recharge de la nappe
E : degré d'engagement, type de mesure, bouquet de mesures, une partie du paiement est versé/rémunéré pour les conseils/contrôles de l'intermédiaire
F : déclaratif (présentation factures, …), contrôles ponctuels avec l'aide de l'intermédiaire

Proposition 2

A : MEL donne budget 'PSE'
B : à une entreprise privée qui par exemple veut créer filière (paille, bois, terre/compost, …)
(création de valeur)
C : MEL accompagne changement de pratique chez l'agriculteur → agriculteur charge de pratique (financé par l'entreprise). Ex : si paille, fauchage tardif ; si bois, forêt, sol vivant etc. → fournisseur de matière première (résiduelle ?) à l'entreprise privée
D : biodiversité, sol vivant → stockage carbon, perméabilité
E : agriculteur rémunéré par l'entreprise privée qui crée de la valeur avec un produit de l'agriculteur et l'entreprise privée peut rembourser la MEL équivalent au budget PSE grâce à la valeur créée, et garder une marge pour chiffre d'affaire et investissement

➔ Aller vers approche circulaire du business

Proposition 3