Short Term Scientific Mission Report

STSM Title:	**Exploring and identification of key factors and approaches of existing PES schemes**
Applicant:	M. Sc. Martina Štěrbová, PhD. National Forest Centre – Forest Research Institute in Zvolen T. G. Masaryka 22, 960-92 Zvolen Slovak Republic
STSM Reference:	Cost Action CA 15206 PESFOR-W
Host institution:	Department of Land, Environment, Agriculture and Forestry, University of Padova, Italy
Host:	Assoc. Prof. Paola Gatto
Period:	11th – 24th February 2018

Report Contents:

1. Introduction

Nature provides numerous goods and services for the benefit of citizens which have value to human societies. However, many goods and especially services are not marketed, but are still of great value. The most ecosystem services accrue to the recipients as public goods and that makes it difficult to observe their values directly. They may be enjoyed by any number of people without affecting other people's enjoyment. The problem with public goods is that, although people value them, no one person has an incentive to pay to maintain the good. Possible solutions include applying regulations to enforce their provision or developing incentive mechanisms, which encourage woodland owners to provide them. We speak about payments for ecosystem services (PES) mechanisms.

In the literature there is a wide discussion according to conceptual definition of 'PES'. According to Wunder (2005), PES are "a voluntary transaction, in which a well-defined environmental service (or a land use likely to secure that service) is "bought" by a (minimum of one) buyer from a (minimum of one) provider if and only if the provider continuously secures the provision of the service (conditionality)." Muradian et al. (2010), define PES as "a transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources". Finally, Wunder (2015) provides a revised version of his original 2005 definition, according to which "PES are voluntary transactions between service users and service providers that are conditional on agreed rules of natural resource management for generating offsite services."

In the pan-European region, high importance of this issue is empathised by the former and ongoing work carried under the guidance of different international organisations and initiatives, e.g. joint effort of UNEP/UNECE/FAO on payments for ecosystem services in a green economy; study on valuation and payment approaches for water related FES conducted by UNECE/FAO Forestry and Timber Section; findings from the large EU project NEWFOREX; outcomes of the FORVALUE project coordinated by EFI-EFIMED; COST Action E45 EUROFOREX on valuation of externalities produced by different types of forest in Europe; activities of the Joint Research Centre of the European Commission (EC JRC) on analysis of FES and its implementation into Forest Information System for Europe; studies of DG AGRI and DG ENVIRONMENT of the European Commission on valuation and assessment of ecosystem services; The Economics of and Biodiversity (TEEB) aimed to mainstream values of biodiversity and ecosystem services; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) focusing on global and regional assessment of biodiversity and ecosystem services; the FOREST

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

EUROPE Expert Group (FE EG) on valuation of and payments for forest ecosystem services, that has been established for the period 2016 – 2020, according to the FE Working Programme Action 4.4 "*Incorporating the value of forests ecosystem services in a green economy*" and its two activities 4.4.1 and 4.4.2 "*Promotion of the Pan-European practices on valuation of and payments for forest ecosystem services*" at the Seventh Ministerial Conference in Madrid, works on different approaches to valuation of and payments for forest ecosystem services existing within the pan-European region in order to identify possible methodologies and replicable experience; and many others.

Payments for Watershed Services

Watershed Services can be considered as "the benefits to people produced by terrestrial ecosystem effects on freshwater, with four broad categories (Hack, 2011; Muñoz-Piña et al., 2008; Turpie et al., 2008):

1. Supporting: water-associated supporting services,
2. Provisioning: improvement of extractive or in-stream water supply,
3. Regulating: water damage mitigation,
4. Cultural: water related cultural services."

These benefits are defined by attributes of quantity, quality, location, and timing of flow.

Globally, Payments for Watershed Services (PWS) make-up the largest ecosystem service market (Bennett et al., 2014). Driven by the negative impacts of climate change and economic development for water quantity and quality provision, hydrological services are assuming a leading priority among forest and agriculture-based ecosystems. Indeed, afforestation and sustainable agriculture tend to be among the most rewarded management practices under contracts aiming to achieve additionality in upstream water storage, water quality protection and flood risk mitigation. Although conventionally PES is seen as a market-based tool, most existing PWS in Europe fundamentally depend on public bodies that act as intermediaries. European PWS are thus best described as "PES-like" schemes implemented by public entities, often acting in a rather complex institutional framework (Vatn, 2010). Accordingly, the research to date has tended to focus mainly on analyzing case studies from developing countries and US rather than Europe (Schomers and Matzdorf, 2013).

A large proportion of the world's population is currently experiencing water stress. One of the main challenges in water management is the adequate accounting and evaluation of positive and negative externalities of different uses to provide a better allocation of water resources among

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

competing users. Payments for Environmental Services (PES) offer a promising mechanism in relation to this challenge, especially in the absence of a legislative framework or functioning local governance (Schomers and Matzdorf, 2013). According to the last EU blue print on water, in many European member states there seems to be a lack of integration and implementation of policies on water mainly due to the insufficient use of economic Instruments and poor governance (EC, 2012). PES are therefore, in the same document, encouraged and are likely to become one of the most important tools that the European Commission will try to promote among member states in order to ensure the implementation of the Water Framework Directive.

However, the development and the understanding of PES schemes in the real world are not without problems. These difficulties become more challenging when we apply the PES concept to the provision of water-related services. Payments for Watershed Services (PWS) are those PES schemes that reward farmers or forest managers for improving their management practices or restore valuable water-related ecosystems in order to increase the provision of hydrological services (Leonardi, 2016).

Regarding to the Objective 3 of the COST Action 15206 PESFOR-W, WG1 adopted a working definition for W-for-W PES, based upon 3 criteria:

1. A transfer of resources between at least 2 actors,
2. A transaction explicitly targeted at improving hydrological services,
3. A transfer paying for actions related to trees either primarily for water services; or for bundled (including water) services.

2. Purpose of the visit

The main goal of the STSM was to explore and identify key factors and approaches of existing PWS schemes. The visit has the aim to improve our understanding of governance, financial models and frameworks that rule different PWS initiatives. The topic of the STSM fell within the high interest of the COST Action 15206 and particularly the tasks of Working Group 1, that primarily aims to characterize and critically evaluate the governance models and design structure of W-for-W PES and identify organizational and policy arrangements that could increase the effectiveness of PES schemes and improve their governance. The research relates to WG1 Tasks 1.1 "Characterise design and governance aspects of European W-for-W PES", 1.2 *„Identify Best Practice in PES design and governance",* using Case Studies and STSM topics (A) *„Exploring potential investors' perceptions of what would be needed to attract them to purchase credits, and interest in providing finance"* and (B) *„Exploring motivations and barriers of other potential PES*

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

participants (e.g. farmers, water utilities, landowners and the general public)". The STSM will offer relevant inputs for this COST Action by providing elements and information that will be take into consideration in the design of a Common Protocol evaluation of different PWS schemes.

My host Paola Gatto from the host institution – Department of Land, Environment, Agriculture and Forestry, University of Padova, has thirty years' research experience in the fields of forest and environmental economics and rural development. Her current research activities focus mainly on payments for ecosystem services and other policy tools for the provision of ecosystem services from agriculture and forestry, ecosystem services mapping and modelling and related design of PES mechanisms at landscape scale. Therefore, the STSM was focused on collection, exchange and analysis of information and research results relevant to the issue of payments for ecosystem services and collection, description and analysis of examples for practical solutions of PES mechanisms, with an emphasis on payments for watershed services. During the STSM we shared lessons and experience that helped to develop my skills and knowledge as an early career researcher, too.

3. Methodology

The following combination of scientific methods and approaches was used in order to achieve proposed aims:

Step	Method
Introduction to the issue of PES	CONSULTATIONS AND INTERVIEWS WITH HOST SCIENTISTS - Exchange of information and knowledge
Background to the theory of PES	LITERATURE REVIEW - Screening and collecting of information, relevant research results and published papers - Summarizing of collected information ANALYSIS OF COLLECTED DATA DESCRIPTIVE METHOD
Exploration of PWS case studies inventory	ANALYSIS OF PWS CASE STUDIES DATABASE - Analysis of general multi-criteria assessment framework of case studies - Adjustment of framework according to the CA15206 WG1 domain of interest - Compilation of case studies database according to the new framework - Review of the UNECE-FAO PES case studies database
Review of case studies/best practice examples of PWS mechanisms (in Europe and Slovakia)	CONSULTATIONS AND INTERVIEWS WITH HOST SCIENTISTS LITERATURE REVIEW DOCUMENT ANALYSIS
Exploration of the governance models of existing PWS	ANALYSIS OF COLLECTED DATA DESCRIPTIVE METHOD

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme of the European Union

4. Description of the work carried out during the visit and output of the STSM

In order to fulfil the above mentioned objectives, the research work was structured in the following activities:

Activity	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Visit host institution and consult with host scientists										
Literature review - screening and collecting relevant data										
Exploration of PWS case studies repository and the UNECE-FAO database										
PWS in Slovakia										
Review of PWS case studies										
Exploration of PWS scheme design process										

The STSM dealt with the issue of payments for ecosystem services, with an emphasis on payments for watershed services. In addition, the STSM was focused on the collection, description and analysis of relevant information and examples for practical solutions of PES mechanisms. During the two weeks STSM the following activities were completed:

a) Exchange of information and knowledge with host scientists – In general, during this visit I had a unique opportunity to meet experienced people with a lot of knowledge and to learn from them. I worked mainly with my host Paola Gatto and Alessandro Leonardi. On the daily base, we had meetings, consultations and discussions focused on the issue of PES and conducted as well as on-going research of Water and Forest PES in European countries. During discussions, host scientists gave me a lot of useful advices and ideas associated with improving my own research of PES schemes.

b) Literature search and review – My host Paola Gatto suggested a lot of very interesting literature sources and articles for reading and analysis that extended my knowledge and skills. I focused on the theory of ecosystem and environmental services, overview and different definition of PES and PWS, PWS institutional structure, governance arrangements and models, and also at the screening and collecting of research results and information from case studies of existing

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

PWS schemes especially in Europe. For the purpose of further work with PWS case studies database, I studied in detail Alessandro Leonardi's dissertation thesis *"Characterizing governance and benefits of payments for watershed services in Europe"* and Theresa Bodner's master thesis *"Governance of European PWS schemes case studies from Austria, Germany and Switzerland."*

c) Exploration of PWS case studies inventory – Regarding to the Objective 3 of the COST Action PESFOR-W, we compiled a database of existing cases in the COST action member countries to feed the PES repository. We used Alessandro Leonardi (2016)'s descriptive framework (with some adjustments) to survey such existing cases. The proposed framework is in Annex 1. This version was developed during Opatija meeting in October 2017 and further edited by Paola and Alessandro, including the possibility of using also the UNECE-FAO database of PES case studies. It was also commented and agreed by other WG1 members. During my STSM, I have made additional adjustments of this framework to make it clearer and more understandable. The revision has divided the framework in two parts: the first one reporting the minimum requirement for information, the second part reporting additional information on governance if available. Subsequently, I have edited the database of existing case studies with the respect of up-dated framework structure.

   A collection of PWS case studies should be implemented on a country base. Therefore, within further work with the database, I have prepared an individual list of case studies for each member country (which are already covered by the existing PWS database).

   As a next step, I have explored the UNECE-FAO database of PES case studies to find other tips for additional cases, which are not covered by PWS repository.

   As a further step, a reference person per each country has received an e-mail with 3 attached documents:

   1. The up-dated framework structure,
   2. Excel file with information on surveyed cases in the country,
   3. Tips for additional cases from the UNECE-FAO database.

   An e-mail also included a Word document with the needed instructions (Annex 2). We have asked WG1 members to fact-check and update existing cases, fill the missing information within the database, exclude non W-For-W cases, and possibly coordinate and add further cases. A list of reference people you can find in Annex 3.

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

We have also asked countries with no cases in the database for help and cooperation with collecting relevant data. Reference people (Annex 4) were requested to intensify efforts to find some PWS cases from their countries.

d) Mapping the situation of PWS issue in Slovakia and finding relevant case studies – I have started the research to identify and analyze possible existing PWS schemes in Slovakia. Based on a literature review and document analysis it can be stated, there don´t exist "pure" PWS schemes in Slovakia. However, following mechanisms, that haven´t been conceived as PES but can be connected to some extent to its logic, were identified:

- According to the Act on Forests no. 326/2005, forests in Slovakia may be declared as protective or special purpose if they fulfil specific public interest objectives (including water regulation and supply). Forest management in these forests is limited, therefore the forest owners are exempt from the property tax for these forests. This compensation for limited forest use can be considered as a specific type of PWS.
- A significant part of the territory of Military Forests and Estates of the Slovak Republic, SOE includes important water areas with I. - III. Degree of protection**.** Many watercourses are sources of drinking water, which makes sense due to the strategic importance of water. The importance will continue to increase in the future. In these areas, Military Forests and Estates of the Slovak Republic, SOE, provides water management in accordance with water management and environmental regulations. The Company repairs and maintains the facilities of forest and land improvements and stream dikes. The Company´s branch plants Kažmarok and Kamenica nad Cirochou sell surface water (1 300 000 m^3 per year). In the framework of the Operational Program Environment the construction of 11 flood polders and 230 technical and biotechnical actions within the framework of projects "Project for the construction of flood polders, technical and biotechnical measures I and II" were carried out.
- The implementation of new RDP of the Slovak Republic 2014 – 2020 includes measures/actions connected with Woodland-for-Water objectives. Although, there aren´t measures directly focused on PWS, following measures support actions that are indirectly targeted to improving water management, increasing the water capacity of the area and water retention:

- Measure 12: Natura 2000 and Water Framework Directive payments provides compensation payment for Natura 2000 forest areas,
- Measure 15: Payments for Forestry – Environmental Services and Forest Protection,

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

- Sub-measure Payments for Forestry – Environmental obligations in SPA,
- Sub-measure Payments for Forestry – Environmental obligations in SAC.

e) Detailed study of PWS case studies – During the discussions and consultations with Paola and Alessandro I had a chance to gain a lot of useful information regarding to the situation of existing PES schemes and mechanisms in Europe. My host and her co-workers achieved a lot of experience and success within the research of PES and she gave me a lot of information regarding to their projects engaged in this issue. It allowed me to map PWS case studies and collected the best practice examples, especially from Italy, and also from other European countries, e.g. England, Austria, Germany and Switzerland. It was very useful for the next step of my work during the STSM - the development of a draft governance conceptual framework and analytical tool to characterize and critically evaluate the governance models and design structure of European Woodland-for-Water PES, i.e. examining supply, demand, policy drivers and governance arrangements.

f) The proposal of the analytical framework for qualitative case study interviews – Based on the Leonardi (2016) we have started to propose the basic general framework for the analysis of PWS scheme design process/the governance model. This analysis can help to understand the organizational arrangements, design rules, motivational and cognitive structure of an actor interest and expectations within a PWS. It is also a useful playground in order to understand the different interactions between external regulations at different level and PWS design and adaptation response (likely future behaviour). Enhancing understanding of synergies between PWS and other policies and institutional goals can provide insights for a better integration of PWS with traditional land management practices and tools that are quite rooted within the EU policy context. Moreover, it can provide insights for the link between PWS design and their durability and sustainability. We will distribute the proposal of the framework to a specific subgroup in WG1 for commenting and furthter improvement – we will work by using a shared google-xls folder. It will be also discussed by members of WG1 during the next PESFOR-W Workshop, which will be held from 12th to 15th March 2018 in Castelfranco Veneto, Italy. It will be subsequently adopted according to the given comments and feedback.

5. Future collaboration with host institution

The collaboration with Paola Gatto and host institution continues on several levels, in the perspective of contributing to build up the PESFOR-W repository:

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

- We coordinate the work of WG1 members regarding to fact-check and updating of existing PWS cases and the collection of new case studies from member countries,
- The finding and collection of specific examples of PWS schemes in Slovakia continues and I will expand the existing PWS case studies database of case studies from Slovakia related to Water and Forest PES according to the COST Action WG 1 methodology and domain of interest,
- In a cooperation with specific subgroup in WG1, we work on the development of the governance conceptual framework and analytical tool for further analyses as many cases/the governance models as possible, in order to detect patterns/similar models in similar legal-institutional-political backgrounds.

Furthermore, the visit has given the opportunity to foster and consolidate the cooperation between the National Forest Centre – Forest Research Institute in Zvolen and University of Padova, which is important for recent and ongoing work of the both institutions and also for activities of the WG1 Cost Action 15206 PESFOR-W. Our cooperation will be beneficial also for tasks of the FOREST EUROPE Expert Group on valuation of and payments for forest ecosystem services established according to the FE Working Programme Action 4.4 – 4.4.1 and 4.4.2., and last but not least for general forestry research.

6. Other comments

I would like to thank everyone who made this STSM possible. In particular, to the Chair of the Cost Action CA15206 PESFOR-W Dr Gregory Valatin, as well as to the relevant individuals in the Core group and MC members who approved this visit. I would also like to thank my host institution for the warm welcome, especially Paola Gatto and Alessandro Leonadri, as well other colleagues from the Department of Land, Environment, Agriculture and Forestry, University of Padova. I really appreciate the time they took out of their busy schedule to assistance me during the whole period of my stay.

7. References

Bennett, D. E., Gosnell, H., Lurie, S., Duncan, S. 2014. Utility engagement with payments for watershed services in the United States. Ecosystem Services 8, 56-64.

Bodner, T. 2017. Governance of European PWS schemes case studies from Austria, Germany and Switzerland. Master thesis. 69 p.

Funded by the Horizon 2020 Framework Programme
of the European Union

European Commission, 2012. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A blueprint to safeguard Europe's water resources.

Hack, J., 2011. From Hydrological Ecosystem Service Valuation to Participatory Integrated Water Resource Management, in: AGUA 2011 Ecosistemas Y Sociedad.

Leonardi, A. 2016. Characterizing governance and benefits of payments for watershed services in Europe. Dissertation thesis. 178 p.

Muñoz Escobar, M., Hollaender, R., Pineda Weffer, C., 2013. Institutional durability of payments for watershed ecosystem services: Lessons from two case studies from Colombia and Germany. Ecosystem Services 6, 46-53.

Muradian, R., Corbera, E., Pascual, U., Kosoy, N., May, P. H. 2010. Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services. Ecological Economics 69 (6), 1202-1208.

Schomers, S., Matzdorf, B. 2013. Payments for ecosystem services: A review and comparison of developing and industrialized countries. Ecosystem Services 6, 1–15.

Turpie, J.K.K., Marais, C., Blignaut, J.N.N., 2008. The working for water programme: Evolution of a payments for ecosystem services mechanism that addresses both poverty and ecosystem service delivery in South Africa. Ecological Economics 65, 788–798.

Vatn, A., 2010. An institutional analysis of payments for environmental services. Ecological Economics 69, 1245–1252.

Wunder, S. 2005. Payments for environmental services: some nuts and bolts. CIFOR Occasional Paper No. 42. Bogor, Indonesia. 24 p.

Wunder, S. 2015. Revisiting the concept of payments for environmental services. Ecological Economics 117, 234-243.

COST Association AISBL | Avenue Louise 149 | 1050 Brussels, Belgium
T +32 (0)2 533 3800 | F +32 (0)2 533 3890 | office@cost.eu | www.cost.eu

Funded by the Horizon 2020 Framework Programme
of the European Union

Annex 1 The proposed descriptive framework

Minimum data requirement

Dimensions	Code	Sub-dimensions	Specifications
PES ID	ID1	Code per country	[Descriptive]
	ID2	Scheme name	[Descriptive]
	ID3	Programme administrator	[Descriptive]
	ID4	Country	[Descriptive]
	ID5	Region	[Descriptive]
	ID6	Location	[Descriptive]
	ID7	Spatial coordinates	[Descriptive]
	ID8	Scale (institutional)	[International, national, regional, local]
	ID9	Year of establishment	[Descriptive]
	ID10	Duration (time horizon)	[Long term (>10 years), medium term (btw 5 and 10 years), short term (< 5 years)]
	ID11	Status	[Active - the scheme is currently being implemented] [Pilot - the scheme is being tested] [Design phase - Evidence of a case-study/preliminary valuation/existence of methodology] [Abandoned - the scheme was implemented in the past and has been abandoned due to funds running out, or lack thereof] [Unknown - the status of the scheme cannot be found in any of the source reference libraries/databases]
	ID12	Short narrative description	[Descriptive]
	ID13	Source of information	[Scientific literature (Google Scholar, ScienceDirect, Web of Science etc.); Grey literature (google search); website; Primary data (own research)]

Dimensions	Code	Sub-dimensions	Specifications 1 - if it is Forest system	Specifications 2 - if it is Agro-forest system	Specifications 3 - if it is Fresh water system
Targeted ecosystem and Ecosystem Services (ES)	ES1	Type of Ecosystem (Forest, Agro-forest or Fresh water)			
	ES11	Type of subsystem	[Natural forest, plantation, urban forest]	[Agricultural catchment, plantation, buffer strip]	[Water catchment, riparian forest, wetlands, forest for control of flooding]
	ES2	Water-related issues	[Biological quality, water colour, heavy metals pollution, groundwater depletion, hazard control, missed cultural services, other]	[Nitrates, phosphorus, chemicals, biological quality, water colour, heavy metals, groundwater depletion, hazard control, missed cultural services, other]	[Nitrates, phosphorus, chemicals, biological quality,, water colour, heavy metals, groundwater depletion, hazard control, missed cultural services, other]

	ES3	Rewarded management practices	[chemical inputs restrictions, reforestation, improved forest management, wetlands restoration/maintenance, forest hydrology management practices, water ways monitoring and cleaning, forest certification, water protection areas, other]	[Improved farming practices, chemical inputs restrictions, farm capital works, livestock limits, wetlands restoration/maintenance, water ways monitoring and cleaning, organic certification, water protection areas, other]	[chemical inputs restrictions, wetlands restoration/maintenance, water ways monitoring and cleaning, water protection areas, other]
	ES5	ES - Type of Hydrological benefits targeted	[Supporting (water-associated supporting services); provisional (improvement of extractive or in-stream water supply); regulating (water damage mitigation); cultural (water related cultural services])	[Supporting (water-associated supporting services); provisional (improvement of extractive or in-stream water supply); regulating (water damage mitigation); cultural (water related cultural services])	[Supporting (water-associated supporting services); provisional (improvement of extractive or in-stream water supply); regulating (water damage mitigation); cultural (water related cultural services])
	ES4	ES - Provided Hydrological services as referred on site	[Descriptive]	[Descriptive]	[Descriptive]
	ES6	ES Bundling (With other ES)	[Yes/No] [Carbon, Biodiversity, Social]	[Yes/No] [Carbon, Biodiversity, Social]	[Yes/No] [Carbon, Biodiversity, Social]

Additional governance dimensions (if available)

Dimensions	**Code**	**Sub-dimensions**	**Specifications**
Payments	**PAY1**	Pay source	[Public, private, mixed, citizens]
	PAY2	Pay mode	[Input - based (service suppliers are paid based on the implement management practices); output - based (suppliers are paid based on real programmes outcomes)]
	PAY3	Pay aim	[Avoided negative externalities, compensate negative impacts, compensate opportunity costs, provide positive externalities]
	PAY4	Pay type	[Cash, in-kind, both]
	PAY5	Pay frequency	[One off, periodical, both]
	PAY6	Pay time	[Upfront, after adoption of management practices, after ES delivery]
	PAY7	Pay amount	[€/Ha min, €/Ha max, total transaction last year available, historical transactions]
	PAY8	Pay logic in relation to costs of ES provision	[Spill over (payments targeted to management practices that are already undertaken by service suppliers), partial cover of costs, full cover of costs, above the costs]
Dimensions	**Code**	**Sub-dimensions**	**Specifications**
Actors involved	**AC1**	Type of ES provider	[Public forest owners, private forest owners/managers, collectively owned forests, farmers, public private partnership, local forest communities]
	AC2	Type of ES buyers	[Utilities, government, local institutions (Regional government, Municipalities, PPPs, International cooperation, NGOS, private companies, Funds, joint stock companies]

Dimensions	Code	Sub-dimensions	Specifications
Type	TY1	Legal/regulative background	[Yes/No] [Descriptive]
	TY2	Degree of voluntariness (supply and demand) - the degree to which is the choice of both ES providers and beneficiaries to enter in a payment scheme free and informed	[Regulated mandatory with penalties - PWS are enforced through the use of mandatory regulations which are followed up by penalties] [Regulated markets/agreements - PWS are usually related with environmental impact compensations or banking initiatives] [Voluntary with a regulation framework - PWS are implemented voluntarily but following a detailed regulation that defines terms and conditions of the agreements] [Voluntary without negotiation - PWS are implemented voluntarily, but where one of the two parties is not able to negotiate the terms and conditions of the agreements] [Voluntary through free and informed negotiation - PWS are implemented voluntarily and both parties are fully informed and able to negotiate the terms and conditions of the agreements]
	TY3	Degree of directness - the extent to which individual providers receive direct payments from the ultimate beneficiaries of the ES	[Public procurement - the public entities are buying the ES on behalf of the general public/beneficiaries] [Scope tax (Water charge) - the public entities are buying the ES on behalf of the general public/beneficiaries through a specific scope tax.] [Tradable rights - a banking system service providers and beneficiaries are connected through a brokering/credit developer] [Beneficiary pay funds - PWS that are organized under third party funds or trusts that collect the beneficiaries payments and redistribute them to the service providers] [Bilateral voluntary agreements - contracts are signed directly between beneficiaries and service providers]
	TY4	Degree of commodification - the extent and clarity with which compensation received by the ES providers has been defined as a tradable commodity	[In-kind benefits - no monetary benefits such as trainings, technical advices etc.] [Rewards - social acknowledgement for resource managers who have historically played an important role in the provision of ecosystem services. Rewards are often direct to management practices that are already occurring regardless the payment.]
			[Subsides/incentives - can take the form of additional investments, that users of the resource base are unable to undertake by themselves due to budgetary constraints. That incentives do not cover fully the opportunity costs of more environmentally-friendly practices.] [Payments - payments are expected to cover fully the opportunity cost of more environmentally friendly practices] [Markets - markets are consolidated payments flows among services beneficiaries and providers]
	TY5	Degree of additionality - depends on what is required by law, what is the additional effect of the payment, and at what conditions the payment is actually provided	[Payment by law - for practices that are required by law] [Payment to enforce - for practices that are required by law, but the PWS ensure the enforcement of the law through incentives and monitoring] [Payments for spill over effects - are made in relation to the cost of maintaining the business as usual scenario, monitoring check the land use management maintenance but not the service provision] [Payment by conditional management - in relation to the cost of implementing the management practices, monitoring check the land use management change but not the service provision] [Payment by service provision - in relation to the cost of provision of the ES and monitoring ensure the implementation of the management practices and the actual service provision]

Annex 2 Document with instructions for WG1 members

Dear PESFOR-W action participant,

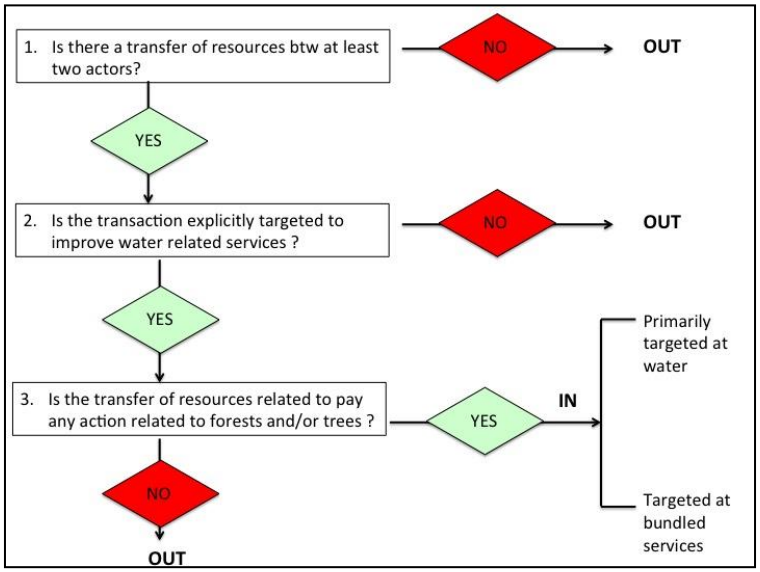
regarding to the Objective 3 of the COST Action PESFOR-W, we compiled a database of existing cases in the COST action member countries to feed the PES repository. We used Alessandro Leonardi (2016)'s descriptive framework (with some adjustments) to survey such existing cases. The proposed framework is in Annex 1. The revision has divided the framework in two parts: the first one reporting the minimum requirement for information, the second part reporting additional information on governance if available.

In Annex 2 you can find the list of the case studies from your country. Within the 5 sheets (1 – ID, 2 – ES, 3 – PAY, 4 – ACTORS, 5 – TYPE), there are the data that we have already had. We are sending these documents to kindly ask you to fact-check this info, fill the missing info and possibly add further cases.

Therefore, to meet above objectives, please follow the instructions below:

I. As a first step, check if each case meets a working definition for W-for-W PES, adopted by the PESFOR-W group, based upon 3 criteria:
   1. A **transfer of resources** between at **least 2 actors**;
   2. A transaction **explicitly targeted at improving hydrological services**;
   3. A transfer **paying for actions related to trees** either primarily **for water services;** or **for bundled (including water) services.**

The group has developed a dichotomous key for W-for-W PES, finalised at identifying cases to be surveyed and analysed:



It does not stress explicitly the attribute of 'voluntariness' (some of the schemes we want to consider may completely lack this attribute or be only partially voluntary – just on one side of the

transaction). **It is however focused only on water and connected ES and requires that the targeted land use include at least 'trees' (if not a forest).** To be noticed that the definition mentions 'resources' exchanged in return to ES provision (not necessarily only money) and requires that **at least 2 actors** are involved in the transactions - meaning one being the buyer and the other the seller.

Such inclusive definition will allow us to include in our domain of interest cases that could be classified as 'quasi-PES' or 'PES-like' as well as cases of 'other economic incentives' or 'imperfect cases'. This is particularly important in geographical areas where the PES concept is only emerging now and schemes or broader initiatives in place can be only partially connected to PES (and probably do not even use the PES language).

II. As a second step, after the selection of relevant cases, fill the missing information within the 5 sheets in Annex 2 – choose one specification for each sub-dimension or write your own description if it is needed. Please, add as many data as possible.

III. As a third step, explore the repository with further case studies from your country. Add new cases directly into the table with the respect of the framework structure. In Annex 3, some of you can find some tips for additional cases from the UNECE-FAO database. Countries with no cases in this database should intensify efforts to find new cases. It is also possible (and needed) to include into the database cases that have only some or even just one feature of a PES, in other words schemes that have not been conceived as PES but can be connected to any extent to its logic. To this end, you should also explore implementation of new RDP's in EU member countries in order to check if the measures/actions have been included connected with Woodland-for-Water objectives. This effort will help us to extend our knowledge on the European situation, including spatial information, and learn from what is already in operation.

Please, send the Excel file with added and completed information and case studies at least on Friday **9 March 2018**, before the next PESFOR-W meeting that will be held from 12th to 15th March 2018 in Castelfranco Veneto Italy.

Thank you for your cooperation.

With kind regards,

Paola Gatto
Martina Štěrbová
Alessandro Leonardi

Annex 3 A list of reference people – countries with case studies in the database

Country	Title	Firstname	Lastname
Austria	Prof	Eduard	Hochbichler
Belgium	Mr	Rik	De Vreese
Denmark	Dr	Suzanne E.	Vedel
France	Dr	Serge	Garcia
	Mr	Julien	Fiquepron
Germany	Prof	Gebhard	Schueler
Hungary	Prof	Laszlo	Radocz
Italy	Prof	Paola	Gatto
Netherlands	Dr	Rudolf	de Groot
	Ms	Giulia	Amato
	Ms	Iskra	Konovska
Portugal	Dr	Claudia	Carvalho-Santos
Romania	Mr	Gavril	Stefan
Spain	Dr	Jose	Barquin
	Dr	Santiago	Begueria
Sweden	Dr	Lars	Högbom
Switzerland	Dr	Paola	Ovando Pol
United Kingdom	Dr	Tom	Nisbet
	Dr	Gregory	Valatin

Annex 4 A list of reference people – countries with no case studies in the database

Country	Title	Firstname	Lastname
Bosnia a Herzegovina	Prof	Mersudin	Avdibegović
Bulgaria	Dr	Alexander	Chikalanov
Croatia	Dr	Dijana	Vuletic
Czech Republic	Dr	Veronika	Gezik
Estonia	Dr	Katrin	Heinsoo
	Dr	Marek	Metslaid
Finland	Prof	Leena	Finér
Greece	Prof	Ifigenia	Kagalou
	Prof	Athanasios	Loukas
Ireland	Dr	Mary	Kelly-Quinn
Latvia	Dr	Uldis	Bethers
		Zane	Libiete
Macedonia	Mr	Aco	Teofilovski
Montenegro	Mr	Novica	Tmušić
Norway	Mr	Johan	Barstad
Poland	Prof	Kazimierz	Banasik
Serbia	Prof	Bojan	Srdjevic
Slovakia	Dr	Attila	Toth
	Dr	Zuzana	Sarvasova
Slovenia	Prof	Spela	Pezdevsek Malovrh