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Article

Water-Related Payment Schemes for Forest Ecosystem Services in Selected Southeast European (SEE) Countries

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Abstract: This paper examines the level of payment for ecosystem services (PES) concept implementation in the financing of water-related forest ecosystem services (ES) in the Republic of Croatia, the Federation of Bosnia and Herzegovina (FB&H), the Republic of Slovenia, and the Republic of Serbia. The focus is on water-related forest ES recognised by the millennium ecosystem assessment (MEA). For the purpose of this paper, the term *pure PES* describes schemes that comply to all five conditions set by Wunder definition and term *PES like* for those schemes that miss some of those conditions. In the first step, the most important legislative documents related to forests, water, and environmental protection were selected. The second consists of a content analysis; focusing on the definition of ES; the definition of fees or payments; the establishment of ‘forest funds’, ‘water funds’, or ‘environmental funds’; and the way these funds were spent. Here we looked at the flow of funding into the forestry sector recognising forest management as the main water-related forest ES provider. Research revealed existence of well-established payments schemes in forestry in Croatia for almost 30 years and in FB&H for some 20 years which were assessed as closest to *pure PES*. In Serbia and Slovenia, there were no PES or *PES like* schemes in the forestry sector. In the water sector the well-established *PES like* payments schemes existing in all four countries. The environmental protection sector, however, rely more on the *tax like* rather than on the *PES like* schemes. Legislation in general recognised the link between forests and water, but this was much more evident in the forestry than in the water or environment sector. The role of the state is strongly pronounced in all countries studied, and was the main driving force behind all payments. However, this position of the state represents also the main obstacle for the development of *pure PES* schemes, together with underdeveloped private forestry and complex socio-economic conditions. Nevertheless, there is room for further development of *pure PES* and *PES like* schemes based on EU or global experiences.

Keywords: PES schemes; *pure PES* schemes; *PES like* schemes; forest; water; South East Europe

1. Introduction

A ‘Payment for Ecosystem Services’—PES as a monetary incentive, occurs when a beneficiary or user of an ecosystem service (ES), also considered as a buyer, makes voluntary and direct payment

to the provider (seller) of defined ES. By that the provider adopt behaviours that are not legally obliged to improve and/or ensure continuation of ES provision, as it compensates the cost and efforts involved [1–6]. Wunder [1] defines PES with five conditions: (i) defined ES, (ii) known providers (forest owners, forest managers), (iii) known buyers, (iv) existing guarantee of the future provision of the ES and (v) that the payment is voluntary, expecting that all PES schemes fulfil all of them. Muradian [7] as a critic to narrowness of Wunder's definition proposes: 'PES as a transfer of resources between social actors that aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources'. The main problem was voluntariness as many schemes involve governmental intervention and public payment schemes [8]. However, for the purpose of this paper the term *pure PES* was used for the schemes that meet all five conditions and term *PES like* for those not meeting one or two conditions set by Wunder [1].

Water and forests are interdependent ecosystems. Forests play an important role in regulating temperature and producing freshwater flows [9], as they retain and purify water in the forest ecosystem and reduce flooding [10]. Therefore, this paper will deal only with water-related forest ES which are by the Millennium Ecosystem Assessment (MEA) [11] included in the provisioning (fresh water) and regulating (floods regulation and water purification) ES. Both, forests and waters are largely underestimated [3,12], which is due to the lack of understanding of their interrelationships and the complexity of both systems. Forested watersheds are essential for sustaining freshwater supplies, but it is not always easy to link downstream water quality with upstream forest management [3]. The reasons for this is the distance between forests and water users, because although forests and water are linked, they present different systems usually belonging to different parties (state, companies, private individuals, local authorities) and are managed by different managers. There is already a legal framework established by different administrations, which makes management of forests aiming to provide water-related ES as one of the main challenges [3]. It is important because the sustainable management of natural capital and ES is the most cost-effective way to sustain their benefits to human wellbeing [13,14].

All of those conditions make it difficult to connect providers (managers) with buyers (users, payers) of water-related forests ES in order to transfer money to those who manage forests [15]. Even if the ES importance is understood and valued, society is slow to recognise that these services are not only worth paying but also need to be financed [16]. Therefore, despite recognition of their importance, there is no specific policy devoted to governing ES at European Union (EU) or national level [17,18]. The understanding of how '*Payments for Ecosystem Services*'—PES schemes can be applied to the hydrological function of forests reflected through mentioned provisioning and regulating ES, needs to be emphasised and improved in order to achieve mutual benefits for the people and for the environment. One of the solutions for a successful implementation of these PES schemes is integration of the shared values of water and forest ES into the design of PES schemes themselves [19].

The development of PES schemes was followed by rich literature body covering its various aspects: institutional [20–23], design [6,24,25], policy [17,19,26,27] and economics [28–31]. The literature shows its broad acceptance and provides numerous examples of more or less successful forest-related PES programs targeting water services [25,27,29,32–39].

The main driving force behind the PES schemes are policies, as different PES schemes have been designed for their implementation [40]. Some policies, such as the new EU Forest Strategy [41], indicates PES as an innovative mechanism supported by Member States and the Commission to finance the maintenance and restoration of ES provided by multifunctional forests. Second, the EU Biodiversity Strategy for 2020 [42] suggests fostering innovative mechanisms, including PES, to underpin the maintenance and restoration of ES provided by multifunctional forests [43].

Another important driver is the market, which is common for marketable ES as carbon offsetting, recreation or water supply. However, the market-driven PES is also used for biodiversity, erosion control or similar ES. Irrespective of the existence of a market or quasi market, PES systems require effectively functioning market mechanisms for ES, with established relationships between buyers and

sellers, monitoring and regulatory mechanisms to measure performance [44]. For each type of market, the value of ES must be assessed. This is not easy, as there are specific approaches for valuation for each group of ES [44], as there is no generally accepted methodology able to evaluate all forest ES with a common approach [44,45]. However, PES are market-based mechanisms even when policy-driven, and they should not be considered as a stand-alone solution but rather as an integral part of a broader policy approach that includes a variety of market and non-market interventions, taking into account the socio-economic conditions [6,7,46].

The main objective of this paper is to analyse financing schemes of the forests and water sectors in selected countries and to see how the existing payments schemes are related to *pure PES* definition. We also examine which principle is used, ‘*User pays*’ or ‘*Polluter pays*’ as ‘*User pays*’ principle is characteristic for PES schemes and ‘*Polluter pays*’ is characteristic to *tax like* schemes, often used in environmental financing [47]. Here we understand *tax like* scheme as payments for doing harmful actions towards nature. However, taxation in general is the main source of national budgets but for the purpose of our investigation we consider budgetary funding under ‘*User pays*’ principle. Reasons for that was huge variety of taxation reasons which does not comprise polluting as such in first place and big distance from payers to providers of ES. We assumed that larger distance between payers and providers move payment scheme further from the *pure PES*, as weaken the understanding of ES which are provided. The secondary objective was to find out what the main drivers of existing financing schemes are, and whether there are any obstacles in the future development of PES schemes.

With this in mind, regulatory documents that set fees, payments and charges related to forests and water in selected SEE countries were analysed for the forest, water and environmental sectors. Republic of Croatia, Bosnia and Herzegovina (B&H), Republic of Slovenia and Republic of Serbia were selected because they have long been part of the same political system, even part of the same country (Socialist Federal Republic of Yugoslavia). They all have strong and well-developed forestry sectors [48], a similar understanding of the importance of natural resources and are rich in good quality water [49–52]. Currently, Croatia and Slovenia are EU members; Serbia is a candidate country and B&H is a potential candidate [53]. Consequently, one can expect similar policy development and similar aspirations in terms of governance and natural resource management.

In selected countries, both forest cover and the proportion of forest ownership vary [54] (Table 1).

Table 1. Forest cover and ownership in the analysed countries.

Country			Croatia	B&H	Slovenia	Serbia
Forest cover		%	46	63	58	30
Forest Ownership	State	%	76	80	21	53
	Private	%	24	20	76	47
	Other	%	-	-	3	-

Source: [54–56]; B&H—The National Forest Inventory is conducted only on the level of the State (B&H) and not the entity (FB&H), so the data presented in Table 1 refers to the State.

They also share a part of the same water resources through the major Danube River tributaries all belonging to the Black Sea basin: the Sava River Basin (Croatia, B&H, Slovenia, and Serbia), the Mura River Basin (Croatia and Slovenia) and the Drava River Basin (Croatia, Slovenia and Serbia). The natural resources are mainly governed by state. Governing of water as a common-pool resource (CPR) [57], is restricted to state, regional or local governments. Water-related forest ES have characteristics of CPRs too, being a rival and non-excludable. Those ES coming from one of the systems that could be a CPR, like forest [57] make a strong link between CPR management and the existence of ES. Forest managers do not manage water regulation, but they do manage the system that provides this ES [58], which add to the importance of sustainable forest management and needs for its sustainable financing [59]. The public forest administration governs forests regardless of the ownership [54,60].

2. Materials and Methods

The data collection, analysis and comparison of selected countries was carried out according to the protocol divided into the three main parts corresponding to the main research steps (Figure 1): ‘Scope of the Institutional Structure and Legislation’, ‘Data Collection’ and ‘Data Analysis and Interpretation of Results’. All data are collected by the authors and other experts when needed, from September to December 2019.

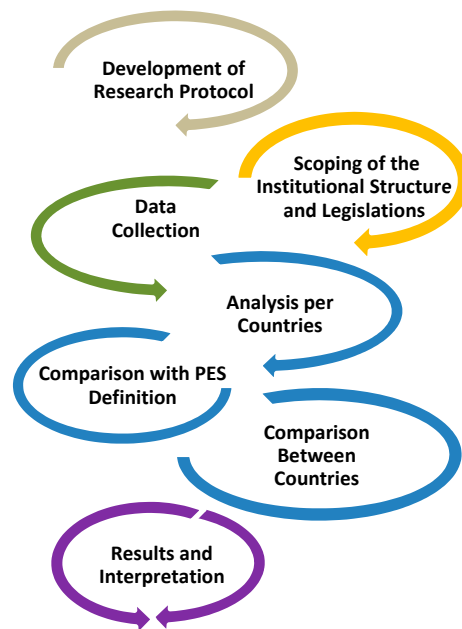


Figure 1. Methodology steps used in analysis.

2.1. Scope of Institutional Structure and Legislation

The first part of the protocol was devoted to identification of the ministries or agencies responsible for the forests and waters governing and for the selection of the potentially relevant policy documents and regulations. The experts searched official websites of the respective country and viewed documents and selected those dealing with the use of forests and waters as resources. The search focused on how the use of forests and waters is regulated, how forests ES are defined in general and in relation to water and what financial arrangements exist, i.e., payments, charges and fees [60]. Search resulted in different number of documents per country: from 5 in Serbia, 7 in Croatia, 9 in Slovenia to the 14 in FB&H (because of involved expert and accessibility of information we limited our further investigation in B&H only to the Federation of Bosnia and Herzegovina (FB&H) as one of the constituting entity) (The Bosnia and Herzegovina is constituted from Federation of Bosnia and Herzegovina, Republic of Srpska and Brčko District).

Finally, national and international websites and databases are searched to find projects focusing on the water-related forest ES in the respective countries and the projects analysed were selected from LIFE, WWF, INTERREG, and UN PES [61] databases.

2.2. Data Collection

Previously identified documents as constitutions, strategies, acts and decrees and rural development programs were collected for relevant sectors and analysed. Qualitative content analysis was used to systematically analyse texts from identified documents, which dealt not only with the manifested content but also with the topics and ideas. Qualitative content analysis includes contextual information, latent content and formal aspects of the analysed documents [62,63]. The original official national documents were collected and the parts of the documents were coded that (i) recognise the

importance of resources (forests and water), (ii) define forests ES (general and specifically related to water), (iii) regulate the use of resources (forest and water), (iv) define fees, charges or payments (who pays, to whom and for what purpose), (v) establish forest, water or environment funds (how the funds are spent). The codes for data and information on internationally driven projects were different: (i) source of funding, (ii) countries involved, (iii) activities financed (related to forest and water).

2.3. Data Analysis and Interpretation of the Results

The last part of the research protocol was intended as a guide for the analysis and interpretation of results. First, the experts were asked to examine the coded parts of the previously selected documents and to examine the links between forest and water in terms of the importance and the specific role in the provision of ES. In the second step, the identified fees, charges or payments were analysed to investigate for what these payments, fees or charges are prescribed and how the expenditure of the collected funds is linked to the provision of the ES. The forest, water and environmental funds were analysed in terms of sources of funding, the basis for establishing funds and collecting and distributing funds. Particular attention was paid to the activities financed, where flow of funds within sector and between sectors was examined (e.g., from ‘water funds’ to forest management and vice versa).

The main characteristics of these payments, charges or fees were analysed in terms of five *pure PES* main characteristics defined by Wunder [1]; which principle is applied (*User pays* or *Polluter pays*) [64]; and whether the expenditure of the collected funds reaches the ES providers. A similar analysis has been carried out using information on internationally driven projects.

Finally, the data collected were compared between countries and some recommendations were made regarding existing drivers and obstacles to further development.

3. Results

The results are presented by countries in following sub-chapters and summarised in Tables 2–5, allowing us to compare countries which is summarised in Section 3.5 and Table 6. The forest and water-related international projects were analysed separately, as many of them relate to more than one country. Selected international projects are listed in separate sub-chapter in Table 7.

3.1. Payments for Water Related Forest ES in Croatia

In Croatia, the importance of forests and waters as natural resources is recognised in the Constitution of the Republic of Croatia [65], which states that they are both protected by the state. Administrative responsibilities are divided (and to some extent overlap) between two ministries. While the Ministry of Agriculture with its Directorate of Forestry, Hunting and Wood Processing Industry is responsible for the forestry, the Ministry of Environment Protection and Energy is responsible for water management and protection and for environmental protection, with forests and waters being considered part of the environment. All legislative documents dealing with forestry, water and the environmental protection in relation of prescribed payments and their purpose are analysed and listed in the Table 2.

Table 2. The Republic of Croatia—legislation, type of charges and the purpose of collected funds.

Documents	Type of Charges	The Purpose of Financing
Act on Forests OG 68/18, 115/18 [66]	Principle ‘ <i>User pays</i> ’; All economic subjects pay 0.0025% of annual income to the special account at Ministry responsible for forestry, for list of ES. Water-related forest ES are defined as: (i) Protection of soil from erosion by water and wind, balancing water ratios in the landscape and preventing floods and high water waves; and (ii) purification of water through percolation into forest soil and the supply of underground streams and water sources with drinking water.	Renewal of forests, forest protection, management of forests in karst areas, restoration of forests threatened by dieback and diseases, forest fires fighting, forest roads building, mine sweeping, protection of gene diversity and development of forest management programs for private forest owners, as well as for execution of certain types of forestry work in private forests.

Table 2. Cont.

Documents	Type of Charges	The Purpose of Financing
Act on Waters OG 66/19 [67]	Main document regulating legal status of waters and for organization and activities of water management	Measures for regulation of hydrological regime and sediment transport, activities and measures of construction of amelioration and drainage facilities, flood protection measures on river basins ('maintenance of watersheds'), Water services financing through water utility facilities e.g., reconstruction or rehabilitation of public water supply facilities for reducing water losses, water quality monitoring
Act on Financing of Water Management OG 153/09, 90/11, 56/13, 154/14, 119/15, 120/16, 127/17 [55]	'User pays'/'Polluter pays' principle—water fees: (i) water contribution, (ii) water regulation fee, (iii) water use fee, (iv) water protection fee, (v) amelioration drainage fee, (vi) irrigation fee, (vii) development fee	
Act on Water Services OG 66/19 [68]	Water services charges—Combination of local level charges (<i>price of water services</i> and development fee) and one part of national level charges (water protection and water use fee)	Activities of the Environmental Protection and Energy Efficiency Fund, environmental protection projects.
Act on Environment Protection OG 80/13, 153/13, 78/15, 12/18, 118/18 [69]	Principle 'Polluter pays', charge for emissions of CO ₂ and other harmful substances. Fee for environment pollution, fee for the use of the environment, fee for burdening of environment by waste, special environmental fee for motor vehicles.	
Act on Environment Protection and Energy Efficiency Fund OG 107/03, 144/12 [69]	Different incomes: local/regional budget in line with jointly defined programs, donations, supports and similar and other sources based on Acts.	Activities, programs and projects in the area of protection, sustainable use and improvement of the environment, energy efficiency and use of renewable energy sources.
Rural Development Programme of the Republic of Croatia 2014–2020 [70]	EU and national funds funding measures for improvement of forest conditions.	Investments in forest area development and improvement of the viability of forests; preservation and/or improvement of forest biodiversity; forest restoration after natural disasters

3.1.1. The Forestry Legislation

The Act on Forests [66] is the most important legal document regulating various aspects of forest management. The act defines nine groups of ES that provide a reason for introducing payments for these services. Two groups of services are directly related to water—(i) protection of soil against erosion by water and wind, balancing the water ratios in the landscape and preventing floods and flood waves, and (ii) purification of water by infiltration through forest soil and the supply of underground streams and water sources with drinking water, which are of interest in this paper (Table 2).

The development of financing schemes for forest ES in Croatia began in the early 1990s' [71] as a consequence of the recognised importance of Mediterranean forests for the supply of ES and shortage of other marketable products of these forests. In circumstances where one third of forest resources were unproductive, in the sense that wood products were scarcer and had no significant market value, the government proposed the 'User pays' principle and applied it to all economic entities in Croatia in order to raise sufficient funds for the protection of forests from fires and pests, forest management and other forestry works in the Mediterranean part of Croatia. Later, the fund was extended to other less productive or unproductive forests (mainly protection and conservation forests), and also to private forests.

At the beginning (1991), economic entities had to pay 0.07% of their income and the fund was administrated by the Public Forest Company 'Croatian forests' based on their plans and needs under the supervision of the Ministry responsible for forestry. In 2013, the Ministry responsible for forestry became administrator of the fund. The amount of payments was first reduced by 25% and then by additional 50%, while the obligation for economic entities was reduced from original 0.07%, to 0.025% of their income [66]. The main reason for the reduction was the constant pressure from large payers (oil industry, telecommunication and pharmaceutical companies). This was also supported by a negative public perception of forestry and a lack of transparency in the distribution of funds [72].

However, even before the reduction, certain categories of economic entities had been exempted from the obligation as part of the government's measures to mitigate the impact of economic crises on

small businesses from 2008 onward [66]. These payments are considered as closest to *pure PES* scheme, as only missing condition is voluntary, as this is always the case when the payments are required by the act.

The Rural Development Program of Republic of Croatia (2014–2020) [70] defines several forestry measures for financing the improvement of the conditions of forest resources, including the ES provision, construction of forest roads, protection of forest, improvement of biodiversity and marketing and trade of forest products. This scheme can be considered as *PES like* of a broader nature, as it operates on a '*User pays*' principle, and it is paid by the many beneficiaries on non-voluntary basis through an intermediary (government) to local provider of usually bundled ES.

3.1.2. Water Legislation

On the other hand, water as another natural resource had long been under the responsibilities of same Ministry of Agriculture (as forestry). Since 2011, however, it has been under the responsibility of the Ministry of Environment Protection and Energy. Legal status of waters and organization of water management is regulated by the Act on Waters [67]. Water-related payments are regulated by the Act on Financing of Water Management [73], which regulates water charges for water management, and the recently introduced Act on Water Services [68,74] that regulates financing of water services related to public supply and sewerage systems (until 2019 it was under the Act on Waters). Fees for the water management: (i) water contribution, (ii) water regulation, (iii) water use and (iv) water protection, are in the interest of the Republic of Croatia and are calculated and collected by the public agency Croatian Waters (legal entity for water management). Calculation and collection of the (v) amelioration drainage fee and the (vi) irrigation fee are the responsibility of the regional government, while local self-government through water services providers is responsible for the (vii) development fee.

The water fees apply both the '*User pays*' and '*Polluter pays*' principle (for the cost of treating the discharged wastewater) and differ in the purpose for which they are intended, the modality of payment, the amount and the baseline for the calculation. The contribution fee is a one-time payment, while others are collected on a continuous basis. The revenues from the above-mentioned fees are used, depending on the priority of needs on the national territory according to the annual plan of Croatian Waters Public Enterprise or on the local territory according to local authorities plans e.g., for financing of flood protection measures in water catchment areas, construction and maintenance of water supply facilities, amelioration facilities, monitoring and determination of water quality (Table 2).

The Act on Waters [75] mentions, afforestation as a protective measure against erosion and torrents in water catchment areas, together with some forestry restrictions in the vicinity of regulatory and protective water installations and in the inundation area. Water charges based on the '*User pays*' principle represent a scheme on non-voluntary basis for the defined water ES. The funds are distributed through an agency to the providers, where they sometimes reach the forest or watershed managers and can be considered as *PES like* scheme in a broader sense.

3.1.3. The Environmental Protection Legislation

The main objective of environmental protection is the protection of flora and fauna, biodiversity, geodiversity, landscape diversity and ecological stability, while at the same time ensuring the sustainable use of the natural resources and improving their condition. On the basis on the Act of Environmental Protection [69], several levies for harmful effects on the environment are prescribed according to the '*Polluter pays*' principle (Table 2). The funds collected are used for the Environment Protection and Energy Efficiency Fund [69]. The fund provides legal entities and private individuals with funds for the various environmental and energy efficiency projects through open tenders and interest-free loans, subsidies, grants and donations.

Among the funded activities there are those related to improving forest management or its status, and those related to the relationship between forest and water, such as improved watershed management in protected areas, including forest management activities. However, the application of

the ‘Polluter pays’ principle means that these payments should be classified under *tax like* rather than *PES like* scheme.

3.2. Payments for Water Related Forests ES in the Federation of Bosnia and Herzegovina (FB&H)

In FB&H, the forest and water administration is organised on federal and cantonal level. Similar decentralised administrative responsibilities exist in the Republic of Srpska and the District Brčko, but this is not the subject of this paper. Respectively, there is Federal Ministry of Agriculture, Water management and Forestry. There is also Federal Ministry of the Environment and Tourism which deals with environment and nature protection, and forests and water as elements of nature. This logic is transferred to the cantons as lower levels of government. Exceptions are some cases that occur at the cantonal level when forestry is under the authority of the ministries of economics and when the ministries dealing with environmental protection are merged with other sectors such as construction, nature conservation or spatial planning.

Forest management is mainly regulated at the cantonal level by the Acts on Forests (Table 3). The Act on Waters regulates water management at federal level, while the Act on Environment Protection regulates the protection of the environment.

Table 3. The Federation of Bosnia and Herzegovina—Legislation, type of charges and the purpose of collected funds.

Documents	Type of Charges	The Purpose of Financing
Federal Act on Forests (OG 20/02) (Federal Act on Forests from 2002 is proclaimed invalid by decision of Federal Constitutional Court) Decree on Forests (OG 83/09, 26/10, 38/10) [76] Cantonal Acts of on Forests and the cantonal Decree on Forests	According to Federal Act on Forests, fee for ES was obligatory for all legal persons, which perform an economic activity in FB&H, except Cantonal Forestry Management Companies. (<i>‘User pays’</i> principle). Cantonal Acts on Forests prescribe that fee for ES is obligatory for all legal persons (except, user of state forests, public institutions, humanitarian organisations, associations and foundations) registered and performing economic activity on the cantonal level) (<i>‘User pays’</i> principle).	Preservation and improvement of forest ecosystems, forest fire prevention forest fires prevention, regeneration of forests after natural disasters, etc.
Act on Waters (OG 79/06) [75]	The water charges. The collecting the water charges is based both on the <i>‘Polluter pays’</i> and <i>‘User pays’</i> principles implying that a water polluter should pay the costs of treatment of the discharged polluted water, i.e., that the water user should pay a charge for using water as a common good. Special water fee and general water fee. (i) Use of surface water and groundwater; (ii) use of water in electric power generation; (iii) protection of water; (iv) extracting materials from watercourses and (v) flood control	Constructing amelioration and drainage facilities, flood control, protection of agriculture, construction, protection of forest land and protection of residential, business and other facilities, reconstruction or rehabilitation of public water supply facilities, reducing water losses. For maintaining watersheds and water basins, the River Basin District Agency receives 40%, remaining 45% is allocated to the Cantonal Budget while 15% is allocated to the Fund for Environment Protection of the Federation of B&H.
Act on Environment Protection of Federation of B&H (OG 33/03) [77]	Costs of monitoring and prevention of polluting the environment are collected from polluters based on the <i>‘Polluter pays’</i> principle.	Activities of environment protection according to the Federal and Cantonal plans. (Federation 30%–Canton 70%).
Fund for Environment Protection (Federal (OG 66/13) [78] and Cantonal. Act on Waters (OG 79/06) and Act on Environment Protection	From charges for environment pollution (the <i>‘Polluter pays’</i> principle), charges for the use of environment (<i>‘User pays’</i> principle), and from specific charges for environment protection paid at registration of motor vehicle, state budget, credits, and donations. Budgetary financing, and from other economic activities.	Protection, preservation and improvement of air, soil and water quality, biological and landscape diversity, energy programs, clearing of mines, conservation, improvement of the environment and forests.

3.2.1. The Forestry Legislation

The importance of forests and waters is clearly defined in forestry legislation at various levels of the government, namely the Act on Forests (invalid since 2009) (The Federal Act on Forests is not valid

but all Cantons have their own Acts or use directions from Federal Decree on Forests so the functioning on local levels is secured) [79] at the federal level and in the acts of forests on cantonal level [80–88].

Legislation of the FB&H defines forest ES in a similar way to Croatian and Serbian legislation [89]. In the forest ordinances, forests ES are non-market-determined forest services and they mainly comprise social forest services as provisioning and environmental as regulating forests services. According to old Federal Act on Forests (invalid since 2009) [79] all legal entities (except those listed in Table 3) that carry out an economic activity in the territory of FB&H were obliged to pay for ES in the amount of 0.1% of their net sales income by applying the ‘*User pays*’ principle. Cantonal Acts of Forests similarly defines ES and clearly recognise the role of forests in water protection, whereas two out of 15 forest functions are water-related. Some cantons use a more general definition of forest functions and list the water protection function as one of the forest ecological functions. Cantonal Acts on Forests also prescribe payments for ES to legal entities in amount ranging from 0.04% to 0.07% of their incomes by applying the ‘*User pays*’ principle. In almost all cantons the collected payments flow into the cantonal budgets. Only in one canton does the 20% go to the federal budget and in the other 20% to the local administration. The cantonal Acts on Forests clearly recognise protection forests, which are used primarily to protect areas in steep terrain and areas prone to erosions, floods, landslides or severe climatic conditions that endanger the existence of the forests, as well as forests whose main purpose is, among other things, to protect springs and streams of watercourses and water reservoirs. The payments are generally used to finance forestry activities such as the improvement of forest reproductive material, the development of forest management plans, protection against forest fire, forest regeneration, forest regeneration after natural disasters and the improvement of forest conditions in general. In all cases where the ‘*User pays*’ principle is applied, we consider these payments to be the closest to a *pure PES* scheme where only the condition of voluntary payment is missing.

3.2.2. Water Legislation

In FB&H, the waters are common property and as such are under special protection of the state, the FB&H, cantons, cities and municipalities. An umbrella regulation that regulates all issues relating to access, extraction and management of freshwater on the territory of the FB&H is Act on Waters [75]. This act stipulates that water management includes water protection, water use, and protection against adverse effects of water and regulation of watercourses and other bodies of waters. The Act on Waters prescribes two types of water fees, a special water fee and a general water fee based on the ‘*User pays*’ principle.

Special water fees include fees for: (i) The use of surface water and groundwater; (ii) the use of water in electric power generation; (iii) water protection; (iv) the extracting materials from watercourses; and (v) flood control. With regard to the general water fee, all natural and legal persons registered to conduct business activity (employers) are obliged to pay the amount of 0.5% of net salary of all employees. This is done simultaneously with the payment of salaries to the employees. Of the total funds generated by the lease of public water property falling under category I and, 40% receives River Basin District Agency. The remaining 45% is allocated to the Cantonal Budget and 15% to the Fund for Environment Protection of the FB&H (Table 3). All revenues generated by lease of public water property falling under II surface water category are allocated to the respective Cantonal Budgets.

The Act on Waters [75] refers to some forest management restrictions in an inundation area and prohibits deforestation of the protective forests or forestry activities that may lead to erosive processes. However, in the water legislation, there are provisions within the framework of special water fees for the levying of charges for flood protection, for the protection of agricultural, construction and forestry areas, and for the protection of residential, commercial and other facilities. Although, these collected funds do not go directly to the forest sector budget, 15% is allocated to the Fund for Environment Protection of the FB&H [78]. Through its development projects, this fund contributes to the improvement and conservation of the environment and thus also of the forests, and it can be regarded as *PES like* scheme.

3.2.3. The Environment Protection Legislation

The Act on Environment Protection [77] prescribes payments for environmental pollution caused by economic activities that have harmful effects and for all motor vehicles when they are registered in accordance with the ‘Polluter pays’ principle. The funds are collected at cantonal level and spent on various projects and activities aiming to protect, prevent and improve the environment at the cantonal level. Of the funds collected at cantonal level, 30% go to the Federal Fund that funds the same kind of projects and activities but at the federal level. It finances development projects in the areas of preserving and improving air, soil and water quality, biological and landscape diversity, energy programs, mine clearance, conserving, and improving the environment, and forests as an important part of the environment. However, this scheme is actually *tax like* scheme although some funds are allocated to the forest programs.

3.3. Payments for Water Related Forests ES in Serbia

In Serbia a single ministry governs forests and waters, while environment protection, including forests and waters as elements of the environment, is governed by another ministry. Water management and forestry are under the Ministry of Agriculture, Forestry and Water Management (MAFWM) while water and forest protection along with air and nature conservation are under the Ministry of Environment Protection (ME). However, the main administrative functions related to the water management reside with ME, or rather the National Water Directorate (NWD) which is under the authority of this Ministry.

As in other countries, forests, water and the environment are dealt with in separate legal documents, namely Acts on Forest [90], Act on Waters [91] and Act on Environment Protection [92] (Table 4).

Table 4. The Republic of Serbia—Legislation, type of charges and the purpose of collected funds.

Documents	Type of Charges	The Purpose of Financing
Act on Forests (OG 30/10, 93/12, 89/15) [90]	Budgetary Fund for forests—From 2010–2012th PES for forest ES has been collected from all economic subjects ‘User pays’ principles. Act on forests defined ES of which three are related to water: (i) balancing water ratios in the landscape and preventing floods and (ii) purification of water through percolation into forest soil and the supply of underground streams and water sources with drinking water (iii) protection of soil, settlements and infrastructure from erosion by water and wind and by landslide. Fund still exists and it is funded by the State budget.	Directs funds for growth of forest coverage by reforestation; improvement of the state of coniferous plantations; conversion of coppice forests to high forests, management, and forest inventory and forest roads construction.
Act on Waters (OG 30/10) [91]	Charges for use of waters resource and charge for use of public water facilities and systems. Budgetary fund based on the ‘User pays’ principle.	For water use, flood prevention and technical aspects of water management.
Act on Environment Protection (OG 135/04) [92]	Charges for water discharge; charge for pollution of water; charge for drainage; charge for basin water management on ‘Polluter pays’ principle.	Watershed management, improvement of water quality, flood prevention and other technical aspects of water management. Funding or different activities, programs and projects in area of environment protection.
Green Fund, budgetary fund, Act of Environment Protection (OG 135/04) [92]	Financed by budget, donations, credits and other public revenues.	Used for protection, preservation and improvement of quality of air, water, soil and forests and mitigation of climate change effects.

3.3.1. The Forestry Legislation

The concept of forest ES payments was introduced by the Act on Forests [90] and was only implemented from 2010 to 2012. The payment was similar to that in Croatia and FB&H. All legal entities were obliged to pay 0.07% of their income to the budgetary fund. The purpose of the fund was to improve forests and their functions, where at least three of which were directly related to water bodies (Table 4). The fund was spent on re-forestation, improvement of the conditions of coniferous plantations, converting coppice forests into high forests and all other aspects of forest management (Table 4). Unfortunately, because of the political pressure, the payment only existed for a short period of time and is considered close to *pure PES* scheme with no voluntary condition.

The Budgetary Fund for Forests still exists, but it is financed from other income in the national budget. The distribution of the funds remains the same (Table 4), but it is still a rather *tax like* scheme, as many of budgetary revenues come from various taxes without any connection to the forest ES at all.

3.3.2. Water Legislation

The Fund for Water was established in 2010 by the Act on Waters [91] which also prescribes six types of ‘*User pays*’ charges for the use of public water facilities and systems (Table 4). The main purpose of the fund is the management of water catchment areas and flood prevention. The special role of forests in flood prevention and as parts of water catchment areas is not directly recognised, but some activities related to provision of water related forest ES are financed from it. This water fund scheme tends to influence decision-making about land (watershed) management [93] only partially fulfilling pure PES criteria so it is considered as *PES like* scheme.

3.3.3. The Environmental Protection Legislation

The Act on Environmental Protection adopted the ‘*Polluter pays*’ principle and introduced fees for the water discharge; charges for water pollution; charges for drainage and charge for water management of the basin. The funds are collected in the Fund for Environment Protection and finance activities mainly in the aspects of watershed management and improvement of water quality and various activities under the environment protection programs and projects.

By the same Act, the Green fund was established as a budgetary fund, from which the funds are distributed in accordance with annual plans for protection, preservation and improvement of the quality of air, water, soil and forests and for mitigating the effects of climate change.

Some other environmental funding mechanisms focus on the provision of services, such as the use of protected natural areas and biodiversity, but do not cover some other regulatory services, such as natural flood protection and water purification [87]. Although there are some *PES like* conditions [94,95], important aspects of a ES comprehensive mechanism that ensures the necessary financial support for the provision of ES are still missing and this scheme is considered to be a *tax like* one.

3.4. Payments for Water Related Forests ES in Slovenia

In Slovenia, the importance of forests and waters as natural resources is recognised in the Constitution of the Republic of Slovenia [96], as forest and water are public goods managed by the state.

Forest and water in Slovenia are under the responsibility of two ministries—The Ministry of Agriculture, Forestry and Food (forest sector) and the Ministry of Environment and Spatial Planning (water sector). From the perspective of forest PES in relation to water, Resolution on National forest program and Rural Development Program are important. The main objective of the Resolution on National Forest Program [97] is related to the sustainable development of forest as ecosystem in terms of their biodiversity and all their ecological, economic and social functions. The Program for Rural Development of the Republics of Slovenia (2014–2020) [98] regulates the financing of various programs and measures in agriculture and forestry.

Forest management is regulated at state level by the Forest Act. In addition to this Act, there is also Act on the Management of State Forests, which regulates the principles and objectives of state forests management. There are also a number of decrees and rules that further regulate specific issues of forest management and the financing of investment. The Act on Waters regulates water management at the state level, while the Act on Environment Protection and the Nature Conservation Act regulate the nature conservation issues.

The legislative documents dealing with forestry, water and the environmental protection in relation to the prescribed payments and their purpose are listed in Table 5.

Table 5. The Republic of Slovenia—Legislation, type of charges and the purpose of collected funds.

Documents	Type of Charges	The Purpose of Financing
Forest Act (OG 30/93, 56/99, 67/02, 110/02, 115/06, 110/07, 106/10, 63/13, 101/13, 17/14, 22/14, 24/15, 9/16, 77/16) [99]	Determination of forest functions and groups them into 3 categories: ecological, social and productive; Hydrological function and protection of forest lands and stands function are ecological functions.	Silviculture and protective measures are funded by state budget (full or partially funding). Sustainable forest management (subsidies can be realised in nature (e.g., tree plants) or in money.
Act of management of state forests (OG 9/16) [100]	The Forest Fund is established which is financed from the revenues from the disposal of state forests and annual compensation for the management of state forests (20% of income from the sale of timber from state forests)	The resources of Forest fund can be used for measures in the Natura 2000 area in private forests in accordance with the Natura 2000 site management program and the forest investment program prepared by the Slovenian Forest Service in accordance with the law governing forests, on the basis of the national forest program
Act on Waters (OG 67/02, 2/04, 41/04, 57/08, 57/12, 100/13, 40/14, 56/15) [101]	Payment for water rights, 'User pays'. Water fee—The taxpayer pays compensation for water during the year in the form of monthly instalments. Establishment of Water Fund (Budgetary fund (Funds from the sale of water and waterside land). Compensation for the established easement or building rights in accordance with this Act and Payment for water rights in a work belonging to the country and water charges, 'User pays' principle.	The funds of the Water Fund are used to finance: (1) Water infrastructure including the purchase of land needed for its construction, (2) the construction of national and local infrastructure, (3) production of water management plans, and technical tasks related to the determination of plots of water land, (4) the construction and modernization of public water infrastructure, (5) purchase of water and waterside land and offshore financing the purchase of land by local communities on the basis of the Act.

Table 5. Cont.

Documents	Type of Charges	The Purpose of Financing
Act on Environment Protection (OG 39/06, 49/06, 66/06, 57/08, 70/08, 108/09, 108/09, 48/12, 57/12, 92/13, 56/15, 102/15, 30/16, 61/17, 21/18) [102]	Environmental taxes 'Polluter pays' and environmental permit for activities and installations that could cause large-scale environmental pollution (IPPC permit), of eight environmental taxes one is directly related to water (pollution caused by wastewater discharge), and trade in emissions rights. Based on this Act Slovenian Environmental Public Fund 'Eco Fund' is established. Eco fund is a public financial fund pursuant to the regulations governing public funds that promote sustainable development by funding investments to prevent, eliminate or reduce the burdening of the environment.	Development of programs for reducing emissions into water and soil, implementation of rehabilitation plans, keeping the databases, records and registers, monitoring and processing reports on wastewater monitoring, conducting administrative procedures in the field of emissions into water and soil. The instruments used by the Eco Fund to perform its activities are: loans with a favourable interest rate, guarantees or other types of warranties, capital investments (equity partnership), grants, including interest rate or loan-related cost subsidies, financial leasing.
Rural Development Programme of the Republic of Slovenia 2014–2020 [98]	EU and national funds funding measures for improvement of forest conditions.	Investments in forest area development, improvement of the forest viability, preserving and improving biodiversity in forests, restoring forest potential destroyed after natural disasters.

3.4.1. The Forestry Legislation

The Forest Act [99] is the most important legal document regulating various aspects of forest management. According to act [99] forests are multifunctional. The act defines seventeen forest functions giving ES very high importance. The Forest functions are divided into: (a) Ecological (the function of protection of forest soil and stands, hydrological function, function of conservation of biodiversity and climate function); (b) social (protective function—Protection of built structures, recreational, tourism-related, educational, research, hygienic-health function, the function of protection of natural values, the function of protection of cultural heritage, defence and aesthetic function), (c) productive (wood production, harvesting of other forest goods and hunting economy). Water related services are recognised under hydrological function and protection of forest lands and stands functions which are one of the most important ecological function.

Slovenia is the only one of the analysed countries with a developed Resolution on National Forest Programme (RNFP) [97]. RNFP as a basic strategic document aimed at defining national policy of sustainable development of forest management based on the ecosystem approach and sustainable development principles. One of the guidelines of RNFP proposes that *'the natural structure of forest communities should be maintained and established; including natural development of completely wild forest area, and water and other non-forest ecosystems in forests should also be preserved'*. The RNFP [97] has a special chapter on the importance of forest regarding good water status, in which the aim is to optimise the contribution of forests to good surface and ground water status, a balanced water regime, without extreme water flow and maintenance of the natural balance between water and riparian ecosystems. However, the RNFP does not impose any fees for ES, as it is financed from the national budget.

The Act on Management of State Forests [100] regulates the principles and objectives of management of state forests. On the basis of this act, a budgetary fund for forest has been established, which is financed from the income from the sale of state forests and the annual compensation for the management of state forests. The funds may also be used for Natura 2000 sites measures in

private forests in accordance with the Natura 2000 site management program and the forest investment program, prepared by the Slovenian Forest Service in accordance with the act governing forests, on the basis of the National Forest Program.

The Rural Development Program of Republic of Slovenia (2014–2020) [98] includes measures related to forestry (M8—Investment in forest area development and improvement of forest viability), which provides funds for the improvement of forests resources (sub-measures: repairing damage and restoring forests following a natural disaster, arranging the back roads necessary for the restoration of forests). These sub-measures are intended to improve the ecological functions of the forest while regenerating forests damaged in the natural disaster. This scheme can be considered as *PES like* in a broader sense, as it applies the ‘*User pays*’ principle.

3.4.2. Water Legislation

The Act on Water [101] regulates the management of water and includes the protection of waters, water management and decision-making on water use. According to the provisions of this Act, with the exception of general use, water right payments and water use fees shall be paid for any use of water public goods. Payments for water right and water use fees are considered as environmental taxes levied on the use of natural goods. In addition, environmental taxes on water pollution must be paid in accordance with environmental legislation, in line with the ‘*Polluter pays*’ principles. The Act on Waters also mentions reforestation as protection measures against erosion and torrents in watersheds, as well as some restrictions on forest management in the vicinity of regulatory and protective water installations and in floodplains.

On the basis of the Act on Waters [101], the Water Fund is established as a budgetary fund, and is administered by the Ministry of Environment and Spatial Planning. The funds come from prescribed charges and fees according to the ‘*User pays*’ principle, but also from the sale of water and waterside land and from compensation for the established easement or building rights. Among activities listed in Table 5, the Water Fund also finances the purchase of water and water catchment areas, which are generally made up of forests. Together with the watershed management, which also consists mainly of forests, it is directly related to forestry and is considered by to be a *PES like* scheme in broader sense.

3.4.3. The Environmental Protection Legislation

The Act on Environment Protection [82] stipulates eight environmental taxes ‘environmental pollution charges’ of which the pollution caused by wastewater discharge is directly related to water, although any other pollution may affect forests and water bodies. Various economic instruments have been introduced to reduce adverse environmental effects, such as an environmental tax based on the ‘*Polluter pays*’ principle which is one of the *tax like* schemes.

Based on Act of Environmental Protection, Slovenian Environmental Public Fund ‘Eco Fund’ is established. Eco fund is a public finance fund in accordance with the rules of public funds that promote sustainable development by funding investments aimed at preventing, eliminating or reducing pollution. The activities carried out by the Fund in the public interest are, in particular: (1) Stimulating investments in environmental protection infrastructure of national and local importance; (2) stimulating investments to increase the use of renewable energy sources; (3) stimulating measures for the efficient use of energy. The instruments used by the Eco Fund to carry out its activities are: soft loans, guarantees or other types of guarantees, equity partnerships, grants, including interest-rate or loan-related cost subsidies, financial leasing.

3.5. Comparison of Existing Payment Schemes between Countries

In this sub-chapter the separately analysed countries will be compared to stress similarities in approach to financing of water related forest ES provision. The payment schemes are grouped by sectors and data presented were crucial for as to decide which payment scheme can be considered as *pure PES* or *PES like* scheme (Table 6).

Table 6. Comparison of payments schemes between countries.

Sector	Criteria	Countries				PES Type
		Croatia	FB&H	Serbia *	Slovenia	
Forest Payments—User pays principle	Known Providers	Forest managers (state and private)	Forest managers	Forest managers	Government and forest managers	As only one of criteria is not fulfilled and payment is state governed we consider this type of payments closest to <i>pure PES</i> as it can be in given circumstances.
	Known Buyers	Economic subjects	Economic subjects	Economic subjects	Government	
	Defined ES	Yes	Yes	Yes	Yes	
	Secured provision	Yes, by act	Yes, by act	Yes, by act	Yes, by act	
	Voluntary Payments	No	No	NA	No	
Rural Development Program—User pays principle	Known Providers	Forest managers	NA	NA	Forest managers	Fulfilling 3 of 5 criteria, no voluntary and with bundled ES difficult to recognise water related forest ES, and difficult to connect payers with provides we consider this as <i>PES like</i> .
	Known Buyers	Yes (budgetary funds)	NA	NA	Yes (budgetary funds)	
	Defined ES	Bundled	NA	NA	Bundled	
	Secured provision	Yes, by act	NA	NA	Yes, by act	
	Voluntary Payments	No	NA	NA		
Water fees—User pays principle	Known Providers	Poorly defined	Poorly defined	Poorly defined	Poorly defined	Water fees in the light of paying for provision of water related forest ES fulfil only 2 criteria and 2 partially. As forestry is poorly recognised as provider of ES and it is not voluntary, it can be consider only as <i>PES like</i> .
	Known Buyers	Yes	Yes	Yes	Yes	
	Defined ES	Yes, some technical, not all connected to the forests	Yes, some technical, not all connected to the forests	Yes, some technical, not all connected to the forests	Yes, some technical, not all connected to the forests	
	Secured provision	Yes, by act	Yes, by act	Yes, by act	Yes, by act	
	Voluntary Payments	No	No	No	No	
Water fees—Polluter pays principle	Known Providers	Water managers	Water managers	NA	NA	As part of water fees for discharge of polluted water or development fees are based on polluter pays principle we consider those <i>tax like</i> schemes, and not PES
	Known Buyers	Polluters	Polluters	NA	NA	
	Defined ES	Poorly	Poorly	NA	NA	
	Secured provision	Yes, by act	Yes, by act	NA	NA	
	Voluntary Payments	No	No	NA	NA	

Table 6. Cont.

Sector	Criteria	Countries				PES Type
		Croatia	FB&H	Serbia *	Slovenia	
Environmental payments—Polluter pays principle	Known Providers	Forest and watershed managers	Forest and watershed managers	Forest and watershed managers	Forest and watershed managers	Analysed payments due to use of polluter pays principle consider as <i>tax like</i> scheme so this is not PES
	Known Buyers	Polluters	Polluters	Polluters	Polluters	
	Defined ES	Poorly	Poorly	Poorly	Poorly	
	Secured provision	Yes, by act	Yes, by act	Yes, by act	Yes, by act	
	Voluntary Payments	No	No	No	No	
Environmental payments—User pays	Known Providers	Forest and watershed managers	Forest and watershed managers	Forest and watershed managers	Forest and watershed managers	These payments use user pays principle but due to the poor definition of ES and difficulties to link users with providers this is not considered as <i>PES like</i>
	Known Buyers	Users (part from water fees)	Users (part from water fees)	Users (from state budget)	Users (part from water fees and state budget)	
	Defined ES	Poorly	Poorly	Poorly	Poorly	
	Secured provision	Yes, by act	Yes, by act	Yes, by act	Yes, by act	
	Voluntary Payments	No	No	No	No	

* In Serbia this type of payment was active only for 2 years period and it is not active in present time.

Similarities in forestry, part of water management and harmony with environment protection sectors can be seen. In further analysis we look not only if all conditions were met, but also how the collected funds are spent. Our interest was to see is there any flow of funds from water and environment funds to forest management.

3.6. Financing Schemes in Analysed Countries that are promoted by International Organisations

Another source of funding for the forest ES provision is international projects financed by international Non-Governmental Organizations (NGOs), such as United Nations Development Program (UNDP), the World Wildlife Fund (WWF), the World Bank (WB) or jointly from the national or EU and international funds (Table 7). Those funding opportunities are available not only to EU Member States but also for Serbia and FB&H.

The role of international organisations and funds is to support government efforts to protect the environment by filling the gaps created by limited human and financial capacities or even lack of awareness. It is important to recognise improved forest management (fire-fighting, conversion of conifers to deciduous forests, water-friendly forest technologies and sustainable forest management) and reforestation as management practices to ensure the provisioning of forest hydrological ES [8]. It is not easy, and many governments and local NGOs need international help to launch these activities and to implement financing programs such as PES.

We have selected 15 projects to finance forest management practices related to water and water conservation, most of which are LIFE projects (Table 7). One project funded by the Dutch government (Table 7) covered all four countries. There are two examples of mixed financings, i.e., projects financed by several financing organisations. One example is the Drava, Mura and Danube water management project (financed by WWF, UNESCO, MAVA Foundation; Coca-Cola; Asamer Holding and the EU programs INTERREG and LIFE). The other example is the project Promoting PES for ES and related sustainable financing programs in the Danube basin (funded by Global Environment Facility (GEF), UNDP and the European Commission).

Table 7. Examples of international financing programs and projects.

Country/s	Name of Payment Scheme	Type of Project	Compensation Means
Croatia	IBM—Central Posavina—Wading toward Integrated basin Management	LIFE05 TCY/CRO/000111	Landscape and habitat management, uniform payments for given management practices, Nature park Lonjsko polje
Croatia	MURA—Establishing institutional capacities for protection of river Mura	LIFE04 TCY/CRO/000030	Biological diversity, uniform payments for given management practices, landscape management, improvement of water quality
Croatia	Strengthening the Institutional and Financial Sustainability of the National Protected Area System—PARCS project	UNDP	Compensation for legal restrictions Government-initiative (Public and private partnership) EU Croatia State-wide
Croatia, Hungary	LIFE old Drava	LIFE13 NAT/HU/000388	Water management, revitalisation of old river course, uniform payments for given management practices
Croatia, Hungary	WISEDRAVALIFE	LIFE17 NAT/HU/000577	Water management for the conservation of riverine and floodplain habitats along Drava river, uniform payments for given management practices
Croatia, Slovenia, Serbia	DRAVA LIFE—Integrated river management	LIFE14 NAT/HR/000115	Protection of water, water regulation, sectoral cooperation, uniform payments for given management practices, Natura 2000 sites, forests

Table 7. Cont.

Country/s	Name of Payment Scheme	Type of Project	Compensation Means
B&H	Development of a new management policy for the Hutovo Blato wetlands, B&H	LIFE99 TYC/BIH/035	Protected areas, wetland, forests, Biodiversity, uniform payments for given management practices, Agriculture, Forestry, River basin management
Slovenia	WETMAN—Conservation and management of freshwater wetlands	LIFE06 NAT/SI/000066	Drainage system, land restoration, landscape conservation, wetland system, uniform payments for given management practices
Slovenia	BIOMURA—Conservation of biodiversity of the Mura river	LIFE06 NAT/SI/00006	Alluvial forests with <i>Alnus glutinosa</i> (L.) Gaertn and <i>Fraxinus excelsior</i> L, riparian mixed forests, River basin management, uniform payments for given management practices
Slovenia	RIVEDRAVA—Riparian Ecosystem Restoration of the Lower Drava River in Slovenia	LIFE11 NAT/SI/000882	Restoration measure, river, alluvial forests with <i>Alnus glutinosa</i> (L.) Gaertn and <i>Fraxinus excelsior</i> L, Habitats—Freshwater, uniform payments for given management practices
Croatia, Serbia	FORRET-Development of Transboundary Forest Retention, Flood Risk, Environmental and Forestry Management	WWF	Water management, flood management, forest management, uniform payments for given management practices
Serbia	Promoting PES for ES and related sustainable financing schemes in the Danube basin	WWF, GEF/UNEP and the EU Commission	This project promotes and supports land managers who help sustain the benefits that we get from nature.
Croatia, Slovenia, Serbia, Austria, Hungary	Water management of the Drava, Mura, Danube	WWF, UNESCO, MAVA, Asamer Holding, Coca-Cola, INTERREG, LIFE	Transboundary UNESCO Biosphere Reserve, management of water, forest, landscape, uniform payments for given management practices
Croatia, B&H, Slovenia, Serbia	Integrated Transboundary River Basin Management of the Sava	Dutch government	River Sava basin management, uniform payments for given management practices
Croatia, B&H, Slovenia, Serbia, Austria, Hungary	Danube Regional Project Component 1.1–9 Development of the Pilot River Basin Management Plan for the Sava	UNDP/GEF	Implementation of Water Framework Directive in the Sava basin, natural resources, water, nature protection, uniform payments for given management practices

Sources: LIFE database, WWF database, INTERREG, UN PES database [61].

Other important projects are founded by the WWF alone or jointly by UNDP and GEF, present funding schemes [103] that focus on countries and environment protection development. They finance projects related to the watershed management, taking into account the forests as part of the environment.

In general, there are four main types of different financial schemes: public-funded, private self-organised, mixed (public-private) and trading schemes [3]. The publicly funded schemes are most common in the analysed countries. Private, self-organised schemes do not exist at all, and only some mixed and trading schemes can be found.

However the main drivers for these schemes are public concerns, coming from the EU level through the implementation of EU Habitats [104], Birds [105] and Water Framework Directives [106]. The implementation of those directives on national or transnational level can be funded by EU, national, international and private funds or combinations of these. Although there are number of funding programs to support Habitats and Birds Directives as Natura 2000 programs embedded in Regional Development programs (ERDF) and other European Structural and Investment Funds (ESI) (among selected countries only eligible for Slovenia and Croatia), only those focus mainly on nature or species protection are therefore excluded from this analysis.

4. Discussion

The national policies recognise importance of forests and water as natural resources and the link between forest ES and water through its hydrological and protective functions. Forest legislation recognises forest ES in relation to the water by defining the bundled hydrological or water protection functions (Slovenia and some Cantons in FB&H). In detail, they are ES defined by (i) balancing water ratios in the landscape and preventing floods; (ii) purifying of water by percolation into the forest soil and supplying underground streams and water sources with drinking water; and (iii) protecting of the soil, settlements and infrastructure against erosion by water and wind and landslides (Croatia, Slovenia, Serbia and some Cantons in FB&H).

All countries, with exception of Slovenia, have defined ES and prescribed payments based on the 'User pays' principle for benefits of forest ES they use. In Serbia this practise was only introduced and abandoned in 2010–2012, but in Croatia and FB&H is still in power and provides important funds for forest management.

Comparing this practice with the five basic principles of Wunder's [1], it become clear that they consist of (i) defined ES by Act on Forests, (ii) the providers are known (forest owners, forest managers), (iii) the buyers are defined as legal and natural persons obliged to pay and (iv) there is guarantee of the availability and conservation (provision) of the ES in the future (Acts on Forests). In addition, there are articles in every act on forests that require special care for water and water courses when carrying out forestry works. Only the fifth condition (v) voluntary payments are not met in any of the PES schemes analysed. Therefore, this scheme looks more like a *pure PES* than *PES like* scheme (Table 6). However, it is difficult, especially for laypersons liable to pay, to understand and relate expenditure on 'forest road construction', 'forest fire protection' or even 'sustainable forest management' to the provision of water related ES with water supply or any other defined ES.

Water legislation is moving in a similar direction as forest, from the full recognition of the importance of resources in policy, the definition of the use of water, the imposition of water charges (almost the same in all countries studied), to the ways of distributing the funds collected. Here, in cases where 'User principle' is employed, three principles exists: (i) defined ES (Act on Waters); (iii) defined buyers as legal and natural persons who are obliged to pay water fees, and (iv) there is guarantee of the availability and provision of the ES in the future (Acts on Waters). There is a problem with the principle (ii) because the providers are not precisely defined and with the principle (v) voluntariness is also missing. Unfortunately, the role of forests and forest management in the provision of water-related ES is not directly recognised. Long-distance connectivity can be seen in some specific activities founded by those fees, as: 'maintaining of watersheds and water basins' (Croatia, FB&H, Serbia, Slovenia), 'protection of forests and forest land' (FB&H), 'improvement of quality of air, water, soil and forests and mitigation of climate change effects' (Croatia, Serbia) 'acquisition of forests' (Slovenia) and 'purchase of water and waterside land' (Slovenia). These publicly driven schemes are close to *pure PES* but because of the absence of two principles and the predominant technical aspect of water fees and their expenditure, these schemes are considered as *PES like* (Table 6).

Environmental protection legislation is younger than forest and water, but it is gaining in importance and recognition because of the growing pressures, such as climate and other changes, that put nature and the environment on the global agenda [107]. Policy and legislation have recognised the importance of forests and waters as an integral part of the environment and has imposed a range of environmental taxes and charges, mainly based on the 'Polluter pays' principle. Although environmental funds mainly focus on the environment, there are activities directly related to forest and water services. However, most of them were covered by 'protection, preservation of water and environment' (Croatia, Slovenia, FB&H), 'watershed management' and 'protection, preservation and improvement of water and forests' (Slovenia, Serbia) what can also be understood as protection of forests. Slovenia uses environmental funds for the 'development of operational programs for reducing emissions into water and soil and their monitoring'. These payments schemes are even further from *pure PES* than forest and water

payments schemes, first because of the ‘Polluter pays’ principle, which is more *tax like* than *PES like*, second because the payments are not voluntary and there is no link between providers and payers.

Environmental funds also get part of revenues according to the ‘User pays’ principle based on the water acts (Croatia, FB&H, Slovenia) or directly from the state budget (Serbia, Slovenia). Slovenia has also Forest Fund subsidised by the state budget and Water Fund collecting funds based on the ‘User pays’ principle according to the Act on Waters. However, these are not closer to PES either, because of the greater intermediary distance between providers and payers, the poor definition of ES and difficulties in linking the distribution of funds to forest and water management.

Rural Development Programs (2014–2020) in Croatia and Slovenia, consisting measures to ‘improvement of condition of the forests’; ‘maintain and/or enhance biodiversity in forests’; ‘restore forest potential destroyed by natural disasters’. Water-related forest ES are financed indirectly from this fund, using EU and national budgetary sources and the ‘User pays’ principle. These funding schemes are also quite far from pure PES, as they are on the large scale, cover whole country and have several objectives, such as rural development issues and supporting farm incomes. They are not defined ES in detail because they are less targeted, based on non-voluntary payments and have only indirect links with forestry and water management on the expenditure side [93,108]. Therefore, those schemes are considered as PES like.

Internationally funded schemes are analysed separately because they focus on the specific areas and are limited in time, i.e., located in areas in one country or link areas in two or more countries, and lasting for three to four years. These projects are very interesting as they can respond to the need for joint river basin management actions that are jointly implemented by these countries. Forest resources usually exist along the watercourses. Hydrological function of forest is very important and it is crucial part of those projects. The most commonly used funding scheme is the LIFE EU program, followed by other funding schemes and their combinations. Whenever the main source of funding is European Commission, the ‘User pays’ principle applies. Usually these funds are combined with national budget funds according to the same principle. The same principle is applied in the cases where international NGOs as WWF and MAVA Foundation or other private or governmental funds are involved, as they collect funds from a large number of remote donors. In these cases, there are voluntary payments from the private individuals and companies in form of donations which brings them closer to *pure PES* scheme. Nevertheless, the intermediary distance is even greater than in rural development programs examples, and the term beneficiary would be more accurate than the term users, since the use of ES, only if the provision has a global impact, can be considered. Be that as it may, all schemes with prevailing private funding were considered as *pure PES*.

Water related forest ES are perhaps the best example of ES as the direct and indirect contributions of ecosystems to human wellbeing [10]. There is still a lack of understanding that the provision of these ES depends on the management of different resource (forests) [58] and requires additional funding, especially to private forest owners to ensure continuity of ES provision [16]. The lack of markets on which these ES can be traded is another reason why regulatory agencies need to intervene to create these markets [39,109,110]. Examples from analysed countries illustrate those interventions that are more or less successful in financing the provision of water-related forest ES especially through internationally funded projects that are disseminated on international or regional level. The decision to use narrow definition of PES for comparison with national payment schemes requires overcoming the deficiency by implementing conceptually similar but broader schemes in which the state plays a mediating role between the beneficiaries and the providers of water-related forest ES [7]. This broader definition allowed direct payments by the public sector to private landowners for forest management and the provision of the ES [111] and which is common practice in the countries studied.

However, this does not go without conflicting interests of forestry, water management and environment protection especially when it comes to the overlapping of jurisdiction as in the case of protected areas management [112], or in general with the forest management along the water courses. Previous research of conflicts between the sectors sharing responsibilities over natural resources

in region shows that traditional approach and long lasting practise (sustainable forest and water management) can be the main causes of conflicts along with overlapping of responsibilities. Water and forests are good examples for that when it comes to the involvement of different agencies and stakeholders with conflicting interests in their management. For successful solution of this problem cooperation between different sectors is needed and it is possible by applying principles of good forest governance [113,114].

The most important driving force behind the existing payment schemes is public concern, which is reflected in policies. Almost all the schemes presented are driven by the public and are based on the national legislation. In forestry sector, the EU Member States (Croatia, Slovenia) take into account all relevant EU documents, but do not use PES for financing the implementation of these policies. For example, the Croatian Act on Forests with a list Pan European Criteria and Indicators for Sustainable Forest Management but no implementation measures [66]. In the field of water management, the Water Framework Directive (WFD) is implemented in Croatia and Slovenia, but there is no link with fees or defined payments. Therefore, all national payments schemes are determined by the national policies, and this is in contrast with selected international project that call the Water Framework Directive as EU policy. However, the analysed national policies are in compliance with EU policies towards nature resources as they have long-lasting experience in sustainable forest management and continuous care on water and nature in general. The strong position of the state in management of natural resources is also recognised as the main obstacle to the development of *pure PES* scheme. This situation leaves payers with strong opinion that they are already paying enough for the use of forest ES or water as a resource. Strong interest groups openly argue that these payments are burden on economic entities and that they need to be reduced. This underlines the importance of transparency in collecting, distributing and finally monitoring and reporting on the use of the collected funds.

Market-driven schemes do not exist in selected countries, as water use by major producers (such as bottled water or beverage companies) is regulated by concession contracts with governments, leaving no room for the introduction of other type of payment schemes. In forestry, too, governments hold the reins firmly in their hands, and national forestry companies are not involved in these agreements. Even in countries with a higher proportion of private than state-owned forests (Slovenia and Serbia) the private forest sector is still weak and does not position itself as provider or, more precisely, a seller of water-related forest ES. In order to overcome this obstacle, the association of private forest owners should play important role in all analysed countries by advocating and empowering private forest owners to negotiate new PES schemes [115]. Only then will they be able to enter the market as sellers of ES and use PES as its promising mechanism to increase supply and compensate the cost of providing hydrological services [34]. Unfortunately, there is no research in countries analysed in this area, so it is difficult to say about private forest owner's willingness to act as a seller or negotiator in the mentioned process.

5. Conclusions

By investigating the level of PES concept implementation in financing of water-related forest ES in the Republic of Croatia, the Federation of Bosnia and Herzegovina (FB&H), the Republic of Slovenia and the Republic of Serbia we found some valid examples of PES schemes and derived several conclusions.

The administrative management of forests in selected countries is normally carried out by the Ministry of Agriculture, where Forestry and Water management also have their place. Croatia and Slovenia are different, as water management has recently been located only in the Ministry of Environmental Protection and Energy together with nature protection. In FB&H and Serbia, water management is divided between the Ministries of Agriculture, which are responsible for management, and the Ministries of Environmental Protection, which are responsible for its protection as a part of the environment.

Generally, in forestry sector financing schemes were implemented with concept of PES principles placing forest schemes closer to *pure PES* using ‘*User pays*’ principle. This is the case for Croatia, FB&H and Serbia. The water payment schemes case for all countries analysed were more *PES like* scheme in broader sense; although they use ‘*User pays*’ principle. In the environmental payments schemes, in all four analysed countries, the ‘*Polluter pays*’ principle is used, and therefore, position them as *tax like* schemes.

From the listed international projects the mix financing model including private funding is closer to *PES like* scheme than any other projects, so it is seen as a way of developing future *PES like* schemes. As the EU has only recently started to support these schemes, for example through the LIFE program this could be another possible direction for further development of PES.

Strong role of public authorities play important role in designing the PES schemes, acting as a potential buyer and at the same time as a regulator, too [19]. That strong position also represents the main obstacle in PES development in the future. Simončić and Matijašić in Green book of payments for environmental services [40] give some steps in designing PES schemes where, among others: the role of public sector, legal constraints, willingness to pay and institutional arrangement play important role in the gathering and in the distributing of the money.

Accepting that there is a need for additional funding for provision of water related forest ES, with some more effort from national NGOs and with state support there is more room for development of PES schemes which will compensate providers of the ES and ensure its provision in the future. All schemes in the analysed countries, driven by legislation, are missing the condition referring to voluntariness. The examples of voluntary and self-organised payments are seldom and appear only when some international NGOs or private funds are involved. While the current interaction between non-voluntary and voluntary systems hardly can be evaluated, the smart regulation approach (mix of policy instruments including a broad variety of measures and actors to implement them) is necessary for further PES schemes development. Apart of existing regulatory and market-driven arrangements, the potentials of several informative policy instruments in developing innovative and voluntary driven types of PES schemes deserve to be considered. As Engel and others [6] stated, PES schemes are developed in the given environmental, economic, social and political contexts. These diverse stakeholders, with different understanding, knowledge, interests, needs and perceptions of the current state of ES, should be involved and hence empowered during PES scheme design [4].

Similar conclusions were drawn by Pettenella and others [64] based on Italian PES examples. Existing experience and knowledge from number of well-functioning PES schemes in the forest sector in Europe [40] should be used as a basis for development of new PES schemes taking into account the local socio-ecological conditions.

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References

1. Wunder, S. Payments for environmental services: Some nuts and bolts. *CIFOR Ocas. Pap.* **2005**, *42*, 32.
2. Sommerville, M.; Jones, J.P.G.; Rahajaharison, M.; Milner-Gulland, E. The role of fairness and benefit distribution in community-based Payment for Environmental Services interventions: A case study from Menabe, Madagascar. *Ecol. Econ.* **2010**, *69*, 1262–1271. [[CrossRef](#)]

3. *Forests and Water-Valuation and Payments for Forest Ecosystem Services*; UN: New York, NY, USA, 2007; Volume 58, ISBN 9789211171754.
4. Reed, M.; Allen, K.; Attlee, A.; Dougill, A.; Evans, K.; Kenter, J.O.; Hoy, J.; McNab, D.; Stead, S.; Twyman, C.; et al. A place-based approach to payments for ecosystem services. *Glob. Environ. Chang.* **2017**, *43*, 92–106. [[CrossRef](#)]
5. Wunder, S. Revisiting the concept of payments for environmental services. *Ecol. Econ.* **2015**, *117*, 234–243. [[CrossRef](#)]
6. Engel, S.; Pagiola, S.; Wunder, S. Designing payments for environmental services in theory and practice: An overview of the issues. *Ecol. Econ.* **2008**, *65*, 663–674. [[CrossRef](#)]
7. Muradian, R.; Corbera, E.; Pascual, U.; Kosoy, N.; May, P. Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services. *Ecol. Econ.* **2010**, *69*, 1202–1208. [[CrossRef](#)]
8. Leonardi, A. *Characterizing Governance and Benefits of Payments for Watershed Services in Europe*; University Padua: Padua, Italy, 2015; p. 196.
9. Ellison, D.; Claassen, M.; Vira, B.; Van Noordwijk, M.; Sullivan, C.A.; Xu, J.; Archer, E.; Bishop, K.; Gebrehiwot, S.G.; Haywood, L.K.; et al. Governance Options for Addressing Changing Forest-Water Relations Chapter 7 Governance Options for Addressing Changing Forest-Water Relations, Vienna, Austria. 2018. Available online: https://www.researchgate.net/publication/327035471_Governance_options_for_addressing_changing_forest-water_relations (accessed on 5 January 2020.).
10. Ellison, D.; Morris, C.E.; Locatelli, B.; Sheil, D.; Cohen, J.; Murdiyarsa, D.; Gutierrez, V.; Van Noordwijk, M.; Creed, I.F.; Pokorny, J.; et al. Trees, forests and water: Cool insights for a hot world. *Glob. Environ. Chang.* **2017**, *43*, 51–61. [[CrossRef](#)]
11. Reid, V.W.; Mooney, H.A.; Cropper, A.; Capistrano, D.; Carpenter, R.S.; Chopra, K.; Dasgupta, P.; Dietz, T.; Kumar Duraiappah, A.; Hassn, R.; et al. *Millennium Ecosystem Assessment, Ecosystems and Human Well-being: Synthesis*; Sarukhan, J., White, A., Eds.; Island Press: Washington, DC, USA, 2005; ISBN 1597260401.
12. Avdibegovic, M.; Petrovic, N.; Nonic, D.; Posavec, S.; Maric, B.; Vuletic, D. Readiness of private forest owners in Croatia, Serbia and Bosnia-Herzegovina to cooperate in forest roads construction and maintenance. *Sumar. List* **2010**, *134*, 55–64.
13. Costanza, R.; De Groot, R.; Sutton, P.; Van Der Ploeg, S.; Anderson, S.; Kubiszewski, I.; Farber, S.; Turner, R.K. Changes in the global value of ecosystem services. *Glob. Environ. Chang.* **2014**, *26*, 152–158. [[CrossRef](#)]
14. Ekins, P.; Simon, S.; Deutsch, L.; Folke, C.; De Groot, R. A framework for the practical application of the concepts of critical natural capital and strong sustainability. *Ecol. Econ.* **2003**, *44*, 165–185. [[CrossRef](#)]
15. Archer, E.; Bishop, K.; Gebrehiwot, S.G.; Haywood, L.K.; Robson, J.P. *Chapter 7 Governance Options for Addressing Changing Forest-Water Relations*; IUFRO: Vienna, Austria, 2018; pp. 147–169.
16. Small, N.; Munday, M.; Durance, I. The challenge of valuing ecosystem services that have no material benefits. *Glob. Environ. Chang.* **2017**, *44*, 57–67. [[CrossRef](#)]
17. Bouwma, I.; Schleyer, C.; Primmer, E.; Winkler, K.J.; Berry, P.; Young, J.; Carmen, E.; Špulerová, J.; Bezák, P.; Preda, E.; et al. Adoption of the ecosystem services concept in EU policies. *Ecosyst. Serv.* **2018**, *29*, 213–222. [[CrossRef](#)]
18. Chaudhary, S.; McGregor, A.; Houston, D.; Chettri, N. The evolution of ecosystem services: A time series and discourse-centered analysis. *Environ. Sci. Policy* **2015**, *54*, 25–34. [[CrossRef](#)]
19. Balikova, K.; Červena, T.; De Meo, I.; De Vreese, R.; Deniz, T.; Mokaddem, A.E.; Kayacan, B.; Larabi, F.; Zane, L.; Lyubenova, M.; et al. How Do Stakeholders Working on the Forest—Water Nexus Perceive Payments for Ecosystem Services? *Forests* **2019**, *11*, 12. [[CrossRef](#)]
20. Corbera, E.; Soberanis, C.G.; Brown, K. Institutional dimensions of Payments for Ecosystem Services: An analysis of Mexico’s carbon forestry programme. *Ecol. Econ.* **2009**, *68*, 743–761. [[CrossRef](#)]
21. Miteva, D.A.; Pattanayak, S.K.; Ferraro, P.J. Evaluation of biodiversity policy instruments: What works and what doesn’t? *Oxf. Rev. Econ. Policy* **2012**, *28*, 69–92. [[CrossRef](#)]
22. Ezzine-de-blas, D.; Corbera, E.; Lapeyre, R. Crowding-in or crowding-out? A conceptual framework to understand motivations in payments for ecosystem services. *Resour. Polite* **2015**, *2015*, 1–18.
23. Hayes, T.; Murtinho, F.; Wolff, H. An institutional analysis of Payment for Environmental Services on collectively managed lands in Ecuador. *Ecol. Econ.* **2015**, *118*, 81–89. [[CrossRef](#)]

24. Rai, R.; Shyamsundar, P.; Bhatta, L. Designing a Payment for Ecosystem Services Scheme for the Sardukhola Watershed in Nepal. In *SANDEE Working Paper*; South Asian Network for Development and Environmental Economics (SANDEE): Katmandu, Nepal, 2016; pp. 108–116.
25. Porras, I.; Barton, D.N.; Miranda, M.; Chacón-Cascante, A. *Learning from 20 Years of Payments for Ecosystem Services in Costa Rica*; International Institute for Environment and Development (IIED): London, UK, 2013; ISBN 9781843698555.
26. Fitzgerald, K.H.; President, V.; Strategy, C.; Foundation, A.W. *Community Payment for Ecosystem Services in the Amboseli Ecosystem: Leasing Land for Livelihoods and Wildlife*; African Wildlife Foundation (AWF): Washington, DC, USA, 2013; Volume 17.
27. Goldman-Benner, R.L.; Benítez, S.; Boucher, T.; Calvache, A.; Daily, G.; Kareiva, P.; Kroeger, T.; Ramos, A. Water funds and payments for ecosystem services: Practice learns from theory and theory can learn from practice. *Oryx* **2012**, *46*, 55–63. [[CrossRef](#)]
28. Posavec, S. Green tax influence on Croatian forestry. *Forêt Méditerranéenne* **2013**, *34*, 319–322.
29. Brouwer, R.; Tesfaye, A.; Pauw, W.P. Meta-analysis of institutional-economic factors explaining the environmental performance of payments for watershed services. *Environ. Conserv.* **2011**, *38*, 380–392. [[CrossRef](#)]
30. Phan, T.-H.D.; Brouwer, R.; Hoang, L.P.; Davidson, M.D. Do payments for forest ecosystem services generate double dividends? An integrated impact assessment of Vietnam’s PES program. *PLoS ONE* **2018**, *13*, e0200881. [[CrossRef](#)] [[PubMed](#)]
31. Bremer, L.L.; Farley, K.A.; Lopéz-Carr, D. What factors influence participation in payment for ecosystem services programs? An evaluation of Ecuador’s SocioPáramo program. *Land Use Policy* **2014**, *36*, 122–133. [[CrossRef](#)]
32. Valatin, G.; Abildtrup, J.; Accastello, C.; Al-Tawaha, A.R.; Andreucci, M.-B.; Atanasova, S.; Avdibegovic, M.; Baksic, N.; Banasik, K.; Barquin, J.; et al. PESFOR-W: Improving the design and environmental effectiveness of woodlands for water Payments for Ecosystem Services. *Res. Ideas Outcomes* **2017**, *3*, e13828. [[CrossRef](#)]
33. Mayrand, K.; Paquin, M. Payments for environmental services: A survey and assessment of current schemes. *Unisfera Int. Cent. Montr. Can.* **2004**, *52*, 1–52.
34. Schomers, S.; Matzdorf, B. Payments for ecosystem services: A review and comparison of developing and industrialized countries. *Ecosyst. Serv.* **2013**, *6*, 16–30. [[CrossRef](#)]
35. Sánchez-Azofeifa, G.A.; Pfaff, A.; Robalino, J.; Boomhower, J.P. Costa Rica’s Payment for Environmental Services Program: Intention, Implementation, and Impact. *Conserv. Biol.* **2007**, *21*, 1165–1173. [[CrossRef](#)]
36. Robalino, J.; Sandoval, C.; Villalobos, L.; Alpizar, F. Local Effects of Payments for Environmental Services on Poverty—Discussion Paper Series. *Environ. Dev.* **2014**, *24*. Available online: <https://media.rff.org/documents/EfD-DP-14-12.pdf> (accessed on 5 January 2020).
37. Samii, C.; Lisiecki, M.; Kulkarni, P.; Paler, L.; Chavis, L.; Snilstveit, B.; Vojtkova, M.; Gallagher, E. Effects of Payment for Environmental Services (PES) on Deforestation and Poverty in Low and Middle Income Countries: A Systematic Review. *Campbell Syst. Rev.* **2014**, *10*, 1–95. [[CrossRef](#)]
38. Emerton, L. *Assessing, Demonstrating and Capturing the Economic Value of Marine & Coastal Ecosystem Services in the Bay of Bengal Large Marine Ecosystem*; Bay of Bengal large Marine Ecosystem Project (BOMBLE): Roma, Italy, 2014.
39. Yu, H.; Xie, W.; Yang, L.; Du, A.; Almeida, C.M.; Wang, Y. From payments for ecosystem services to eco-compensation: Conceptual change or paradigm shift? *Sci. Total Environ.* **2020**, *700*, 134627. [[CrossRef](#)]
40. Viszlai, I.; Barredo, J.I.; San-Miguel-Ayanz, J. *Payments for Forest Ecosystem Services—SWOT Analysis and Possibilities for Implementation*; JRC—Technical Report; European Commission: Brussels, Belgium, 2016; Volume 31, ISBN 9789279622120.
41. EU, C. *A New EU Forest Strategy: For Forests and the Forest-Based Sector*; European Commission: Brussels, Belgium, 2013; Volume 17.
42. European Commission. *The EU Biodiversity Strategy to 2020*; European Commission: Brussels, Belgium, 2011; Volume 28.
43. Diswandi, D. New Approach on Payment for Environmental Services Literature: Development and Challenges. In Proceedings of the Western Australia Branch 1st Biannual Conference, Perth, Australia, 1 October 2015; Australian Agricultural and Resource Economics Society: Perth, Australia, 2015; p. 14.

44. Group of Experts. *Expert Group and Workshop on Valuation of Forest Ecosystem Services*; Group of Experts: Madrid, Spain, 2014.
45. Vuletić, D.; Posavec, S.; Krajter, S.; Paladinić, E. Payments for Environmental Services (PES) in Croatia—Public and Professional Perception and Needs for Adaptation. *South East Eur. For.* **2010**, *1*, 61–66. [[CrossRef](#)]
46. Hecken, G.V.; Bastiaansen, J. Payments for ecosystem services: Justified or not? A political view Payments for ecosystem services: Justified or not? A political view. *Environ. Sci. Policy* **2018**, *13*, 785–792. [[CrossRef](#)]
47. UNEP. *The Value of Forests—Payments for Ecosystem Services in a Green Economy*; UN: Geneva, Switzerland, 2014; ISBN 9789211170719.
48. Stevanov, M.; Krott, M.; Curman, M.; Krajter Ostoic, S.; Stojanovski, V. The (new) role of state forest institutions in Western Balkans. *Can. J. For. Res.* **2018**, *4*, 898–912. [[CrossRef](#)]
49. Ujević Bošnjak, M.; Gajšak, F. *Izveštaj o Zdravstvenoj Ispravnosti Vode za Ljudsku Potrošnju u Republici Hrvatskoj*; Hrvatski Zavod za Javno Zdravstvo (HZJZ): Zagreb, Croatia, 2019.
50. EEA. *Report European Waters Assessment of Status and Pressures 2018*; EEA: Copenhagen, Denmark, 2018; ISBN 9789292139476.
51. UNECE. *Serbia Environmental Performance Reviews*; UNECE: Geneva, Switzerland, 2015; ISBN 9789210573030.
52. UNECE. *Bosnia and Herzegovina Environmental Performance Reviews*; UNECE: Geneva, Switzerland, 2018; ISBN 9789211171686.
53. EC. *Commission Opinion on Bosnia and Herzegovina's Application for Membership of the European Union*; EC: Brussel, Belgium, 2019.
54. Živojinović, I.; Weiss, G.; Lidestav, G.; Feliciano, D.; Hujala, T.; Dobšinska, Z.; Lawrence, A.; Nybakk, E.; Quiroga, S.; Schraml, U. *Ownership Change in Europe*; European Forest Institute Central-East and South-East European Regional Office (EFICEEC-EFISEE): Vienna, Austria, 2015; ISBN 9783900932268.
55. Hrvatske Šume d.o.o. *Šumskogospodarska Osnova Područja (2016–2025)*; Ministarstvo Poljoprivrede Republike Hrvatske: Zagreb, Croatia, 2017.
56. *Zavod Za Gozdove Slovenije Poročilo Zavoda za Gozdove Slovenije o Gozdovih za Leto 2018*; Zavod za Gozdove: Ljubljana, Slovenia, 2019.
57. Araral, E. Ostrom, Hardin and the commons: A critical appreciation and a revisionist view. *Environ. Sci. Policy* **2014**, *36*, 11–23. [[CrossRef](#)]
58. Fisher, B.; Kulindwa, K.; Mwanjoka, I.; Turner, R.K.; Burgess, N.D. Common pool resource management and PES: Lessons and constraints for water PES in Tanzania. *Ecol. Econ.* **2010**, *69*, 1253–1261. [[CrossRef](#)]
59. UNFF. *Forest Finance*; UNFF: New York, NY, USA, 2016.
60. Rogelja, T.; Ludvig, A.; Weiss, G.; Secco, L. Implications of policy framework conditions for the development of forestry-based social innovation initiatives in Slovenia. *For. Policy Econ.* **2018**, *95*, 147–155. [[CrossRef](#)]
61. Arriagada, R. Making payments for ecosystem services work. *Values Paym. Inst. Ecosyst. Manag.* **2014**, 16–57. [[CrossRef](#)]
62. Mayring, P. *Qualitative Content Analysis, Theoretical Foundation, Basic Procedure and Software Solution*; GESIS: Klagenfurt, Austria, 2014.
63. Drisko, J.W.; Maschi, T. *Content Analysis*; OXFORD University Press: New York, NY, USA, 2016; ISBN 9780190215491.
64. Pettenella, D.; Vidale, E.; Gatto, P.; Secco, L. Paying for water-related forest services: A survey on Italian payment mechanisms. *IForest* **2012**, *5*, 210–215. [[CrossRef](#)]
65. *Statute of Republic of Croatia*; Hrvatski Sabor: Zagreb, Croatia, 1990.
66. *Zakon o Šumama*; Hrvatski Sabor: Zagreb, Croatia, 2018; p. 40.
67. *Zakon o Vodama*. Hrvatski Sabor. Available online: <https://www.zakon.hr/z/124/Zakon-o-vodama> (accessed on 17 January 2020).
68. *Zakon o Vodnim Uslugama*; Hrvatski Sabor: Zagreb, Croatia, 2019; p. 29.
69. *Zakon o Zaštiti Okoliša*, Hrvatski Sabor. Available online: <https://www.zakon.hr/z/194/Zakon-o-zaštiti-okoliša> (accessed on 17 January 2020).
70. *Rural Development Programme of the Republic of Croatia for the Period 2014–2020*; Ministry of Agriculture of Republic of Croatia: Zagreb, Croatia, 2015.
71. *Zakon o Šumama*, Hrvatski Sabor. Available online: <http://extwprlegs1.fao.org/docs/html/cro6516.htm> (accessed on 17 January 2020).

72. Pravilnik o Postupku za Ostvarivanje Prava na Sredstva iz Naknade za Korištenje Općekorisnih Funkcija Šuma za Izvršene Radove u Šumama. Ministarstvo Poljoprivrede. Available online: https://narodne-novine.nn.hr/clanci/sluzbeni/2015_02_22_455.html (accessed on 17 October 2020).
73. *Zakon o Financiranju Vodnoga Gospodarstva*; Hrvatski Sabor: Zagreb, Croatia, 2009; pp. 1–17.
74. T. Carevic Prikaz Zakona o Vodnim Uslugama. Zagreb, Croatia. Available online: <https://informatior.hr/strucni-clanci/prikaz-zakona-o-vodnim-uslugama> (accessed on 6 May 2020).
75. *Zakon o Vodama Federacije BiH*; Vlada Federacije Bosne i Hercegovine: Sarajevo, Bosnia and Herzegovina, 2006; pp. 7653–7682.
76. *Uredba o Šumama*; Vlada Federacije Bosne i Hercegovine: Sarajevo, Bosnia and Herzegovina, 2009; pp. 1–19.
77. *Zakon o Zaštiti Okoliša Federacije BiH*; Vlada Federacije Bosne i Hercegovine: Sarajevo, Bosnia and Herzegovina, 2003; p. 38.
78. *Zakon o Fondu za Zaštitu Okoliša Federacije BiH*; Vlada Federacije Bosne i Hercegovine: Sarajevo, Bosnia and Herzegovina, 2003; p. 13.
79. *Zakon o Šumama Federacija BiH*. Vlada Federacije Bosne i Hercegovine. Available online: <http://www.fbihvlada.gov.ba/bosanski/zakoni/2002/zakoni/13boszakonosumama.htm> (accessed on 18 May 2020).
80. *Zakon o Šumama Županije Posavske*; Vlada Županije Posavske: Orašje, Bosnia and Herzegovina, 2014; Volume 1, p. 24.
81. *Zakon o Šumama Hercegbosanske Županije*; Vlada Hercegbosanske Županije: Livno, Bosnia and Herzegovina, 2014; p. 49.
82. *Zakon o Šumama Bosansko-Podrinjskog Kantona*; Vlada Bosansko-Podrinjskog Kantona: Gorazde, Bosnia and Herzegovina, 2013; p. 45.
83. *Zakon o Šumama Zeničko-Dobojskog Kantona*; Vlada Zeničko-Dobojskog Kantona: Zenica, Bosnia and Herzegovina, 2013; pp. 398–420.
84. *Zakon o Šumama Unsko-Sanskog Kantona*; Vlada Unsko-Sanskog Kantona: Bihać, Bosnia and Herzegovina, 2012; p. 42.
85. *Zakon o Šumama Tuzlanskog Kantona*; Vlada Tuzlanskog Kantona: Tuzla, Bosnia and Herzegovina, 2012; pp. 1–19.
86. *Zakon o Šumama Kantona Sarajevo*; Vlada Kantona Sarajevo: Sarajevo, Bosnia and Herzegovina, 2012; p. 97.
87. *Zakon o Šumama Srednjobosanskog Kantona*; Skupština Srednjobosanskog Kantona: Travnik, Bosnia and Herzegovina, 2014; p. 66.
88. *Zakon o Šumama Brčko Distrikta BiH*; Skupština Brčko Distrikta: Brčko, Bosnia and Herzegovina, 2010; pp. 1–28.
89. Delic, S.; Vuletic, D.; Zadnik Stirn, L.; Avdibegovic, M.; Becirovic, D.; Mutabdzija, S.; Maric, B.; Pezdevsek Malovrh, S. Models of financing forest ecosystem service in the Federation of Bosnia and Herzegovina, Croatia and Slovenia. *Socio Econ. Anal. Sustain. For. Manag.* **2013**, *1*, 15–22.
90. *Zakon o Šumama Republike Srbije*; Vlada Republike Srbije: Belgrade, Serbia, 2012; p. 42.
91. *Zakon o Vodama Republike Srbije*; Vlada Republike Srbije: Belgrade, Serbia, 2010; p. 90.
92. *Zakon o Zaštiti Životne Sredine Republike Srbije*; Vlada Republike Srbije: Belgrade, Serbia, 2004; p. 78.
93. Joslin, A.; Jepson, W.; Joslin, A.J.; Jepson, W.E. Territory and authority of water fund payments for ecosystem services in Ecuador’s Andes. *Geoforum* **2018**, *91*, 10–20. [[CrossRef](#)]
94. Ferraro, P.J. The Future of Payments for Environmental Services. *Conserv. Biol.* **2011**, *25*, 1134–1138. [[CrossRef](#)] [[PubMed](#)]
95. Goran Sekulić *Analysis of PES Needs and Feasibility in Serbia*, 2012th ed.; Todorova, M. (Ed.) WWF Danube-Carpathian Programme: Sofia, Bulgaria, 2012.
96. *Constitution of Republic of Slovenia*; Državni Zbor Republike Slovenije: Ljubljana, Slovenia, 2016; p. 37.
97. Ministry of Agriculture, Economy and Food of Republic of Slovenia. *Resolution on National Forest Program Slovenia*; Perko, F., Ed.; Association of Forestry Societies of Slovenia: Ljubljana, Slovenia, 2008.
98. *Rural Development Programme of the Republic of Slovenia for the Period 2014–2020 Rural Development Programme*; Ministarstvo za Kmetijstvo, Gozdarstvo in Prehrano Republike Slovenije: Ljubljana, Slovenia, 2015; p. 927.
99. *Zakon o Gozdovih Republike Slovenije*; Vlada Republike Slovenije: Ljubljana, Slovenia, 2016.
100. *Zakon o Gospodarenju z Gozdovi v Vlasti Republike Slovenije*; Vlada Republike Slovenije: Ljubljana, Slovenia, 2016; p. 19.
101. *Zakon o Vodah Republike Slovenije*; Vlada Republike Slovenije: Ljubljana, Slovenia, 2015; Volume 1, p. 114.

102. *Zakon o Varstvu Okolja Republike Slovenije*; Vlada Republike Slovenije: Ljubljana, Slovenia, 2009; p. 148.
103. Jaime, C.; Ian, Munro, G. *GEF Investments on Payment for Ecosystem Services Schemes*; GEF: Washington, DC, USA, 2014.
104. EU. *Commission Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora*; EU: Brussels, Belgium, 1992; p. 44.
105. EU. *Commission Directive 2009/147/EC of the EU Parliament and of the Council on the Conservation of Wild Birds*; EU: Brussels, Belgium, 2010; p. 19.
106. EU. *Directive 2000/60/EC on the EU Parliament and of the Council Establishing a Framework for Community Action in the Field of Water Policy*; EU: Brussels, Belgium, 2000.
107. EU. *The European Green Deal*; EU: Brussels, Belgium, 2019; p. 24.
108. Joslin, A. Translating Water Fund Payments for Ecosystem Services in the Ecuadorian Andes. *Dev. Chang.* **2019**, *51*, 94–116. [[CrossRef](#)]
109. Shu, L. Games between stakeholders and the payment for ecological services: Evidence from the Wuxijiang River reservoir area in China. *PeerJ* **2018**, *6*, e4475. [[CrossRef](#)] [[PubMed](#)]
110. Gómez-Baggethun, E.; De Groot, R.; Lomas, P.L.; Montes, C. The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes. *Ecol. Econ.* **2010**, *69*, 1209–1218. [[CrossRef](#)]
111. Smith, S.; Rowcroft, P.; Rogers, H.; Quick, T.; Eves, C.; White, C.; Everard, M.; Couldrick, L.; Reed, M. *Payments for Ecosystem Services: A Best Practice Guide*; Department for Environment, Food and Rural Affairs (DEFRA): London, UK, 2013.
112. Vuletić, D.; Krajter Ostoić, S.; Kiš, K.; Posavec, S.; Avdibegović, M.; Blagojević, D.; Marić, B.; Paladinić, E. Conflicts between forestry and nature protection—Case studies of two Nature Parks in Croatia. *Period. Biol.* **2009**, *111*, 467–478.
113. Vuletić, D.; Avdibegović, M.; Stojanovska, M.; Nevenić, R.; Haska, H.; Posavec, S.; Krajter, S.; Peri, L.; Marić, B. Contribution to the understanding of typology and importance of forest-related conflicts in South East Europe region. *Per* **2013**, *115*, 385–390.
114. Gómez-vázquez, I.; Álvarez-álvarez, P.; Marey-pérez, M.F. Forest Policy and Economics Conflicts as enhancers or barriers to the management of privately owned common land: A method to analyze the role of conflicts on a regional basis. *For. Policy Econ.* **2009**, *11*, 617–627.
115. Lyubenova, M. *Forest Ecosystem Services and Payment Schemes*; Lyubenova, M., Ed.; Sofia University St. Kliment Ohridski: Sofia, Bulgaria, 2019; ISBN 9789540747781.



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