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Forests and forest sectors of Bosnia and Herzegovina, Croatia, Serbia and Slovenia: an analysis of the current state and future expansion opportunities of FSC certification

Supervisor

Dr. Mauro Masiero

Submitted by

Ivan Hederić

Student n.

1224952

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ABBREVIATIONS AND ACRONYMS

BD	Brčko District
C	Coniferous
CB	Certification body
CFMC	Cantonal Forest Management Company
CFO	Cantonal Forest Office
CH	Certificate holder
COC	Chain of custody
EU	European Union
FAO	Food and Agriculture Organization
FBiH	Federation of Bosnia and Herzegovina
FM	Forest management
FMP	Forest Management Plan
FSC	Forest Stewardship Council
GDP	Gross Domestic product
GPP	Green Public Procurement
ha	hectare
km^2	square kilometer
m^3	cubic meter
n/a	not applicable
NC	Non-coniferous
NFI	National forest inventory
PEFC	Programme for the Endorsement of Forest Certification
PFMC	Public forest management company
PFO	Private forest owner
PFOA	Private forests owner's association
RS	Republic of Srpska
TM	Trademark

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SUMMARY

This graduation thesis “Forests and forest sectors of Bosnia and Herzegovina, Croatia, Serbia and Slovenia: an analysis of the current state and future expansion opportunities of FSC certification” is a focus on four forest rich countries. The thesis has three major purposes: presentation of forest and forestry related data for the four countries in a single and easy to follow format, analysis of the current state of the art and expansion opportunities of certification according to the Forest Stewardship Council (FSC) standards in targeted countries, and enhancement of the broad public awareness of sustainable forest management and FSC forest certification scheme.

Literature review and data mining via secondary sources, as well as personal communications with experts were used to present forestry related data of considered countries. A combination of data mining via secondary sources and interviews with experts via questionnaires was used to analyze the current state of the art and expansion opportunities of FSC certification in the four countries.

Forest cover varies from 25% of total land use in Serbia to 58% in Slovenia, while the FSC certified forest area varies from 22% of total forest area in Slovenia to 74% in Croatia. Private forest owners from considered countries still play a marginal role within forest certification and there is room for improving their participation and involvement in the system. Main barriers that private forest owners currently face towards forest certification are the fact that only a few of them manage their forests for commercial forest production, lack of awareness of FSC certification in general and finally certification costs**.**

The total number of registered companies in the wood and paper industry varies from 2 027 in Bosnia and Herzegovina up to 3 413 in Slovenia, while the share of FSC chain of custody (COC) certificate holders varies from 7% in Slovenia up to 15% in Bosnia and Herzegovina. There is great potential for expansion of FSC COC certification in all considered countries due to the large number of companies that currently do not hold an FSC COC certificate as well as the positive recent development of wood and paper industry in all considered countries. The main barriers that companies considering becoming certified face are low FSC brand awareness and demand for certified wood products amongst national consumers that do not justify the costs of certification, as well as low environmental awareness amongst companies themselves.

1 INTRODUCTION

Multiple uses and values of forests and forest ecosystems (i.e. source of timber, regulation and storage of water, soil conservation, wildlife habitat protection, carbon storage, recreation, etc.) are well documented and discussed (Croitoru, 2007; FAO and EFI, 2015; FAO and Plan Bleu, 2018; Acharya *et al.,* 2019). In order to ensure protection and preservation of forest ecosystem functioning and values for present and future generations, while supporting the marketing of responsibly sourced forest products, many forest certification schemes have emerged in the last few decades, with various degrees of sustainable forest management promotion. Forest certification is a market mechanism that promotes sustainable forest management and identifies sustainably produced forest products to final consumers. It directly contributes to three sustainable development goals: decent work and economic growth; responsible consumption and production; and life on land (Rose *et al.,* undated).

This thesis considers the Forest Stewardship Council (FSC) certification scheme, as a predominant forest certification scheme in Bosnia and Herzegovina, Croatia, Serbia and Slovenia. Founded more than 25 years ago, FSC has achieved impressive results of more than 200 million ha of certified forests worldwide (FSC, 2020), and has established itself as a trusted forest certification brand amongst the consumers. Bosnia and Herzegovina, Croatia, Serbia and Slovenia are forest rich countries where the forest sector and trade in forest-based products play an important role. As of February 2020, FSC Italy – an FSC network member, has accepted the responsibility of providing development services for the FSC growth in considered countries: this thesis has been developed within the framework of this. FSC is currently the most common certification scheme in the study area, while the competitor scheme, the Programme for the Endorsement of Forest Certification (PEFC), is currently only present in Slovenia (PEFC, 2020).

Given the growing importance and recognition of FSC certification scheme, and the insufficient coverage of private forest sectors in the targeted countries by scientific community (Krajter Ostoić *et al., 2015;* Nonić *et al.,* 2015), the aims of this thesis are threefold. Firstly, it strives to present a cross-comparison between the current state of forests and forestry sectors in Bosnia and Herzegovina, Croatia, Serbia and Slovenia. This is potentially very useful as currently there are not many resources where the forestry sectors

of these 4 neighboring countries are directly compared in great detail. Secondly, it aims to analyze the current presence of FSC certification scheme in the four countries, as well as possible barriers and opportunities for further FSC certification expansion, with a prevalent focus on private forests.

Lastly, the research aims to enhance the broad public awareness of sustainable forest management (FM) and forest certification schemes in targeted countries by ensuring that this thesis is publicly and freely available as a resource of relevant forestry related information for all.

1.1 Research questions and objectives

The general objective of this thesis is to describe the current state of FSC certification in Bosnia and Herzegovina, Croatia, Serbia and Slovenia and to study future opportunities for FSC certification expansion within these countries.

The general objective is achieved by addressing three specific objectives accompanied by appropriate research questions.

Specific objective 1: Describing and comparing key aspects of the forests and forestry sectors in Bosnia and Herzegovina, Croatia, Serbia and Slovenia. This specific objective is achieved by literature review and data mining via secondary sources, as well as personal communication with experts.
Research question 1: How do forests and forest sectors of Bosnia and Herzegovina, Croatia, Serbia and Slovenia compare?

Specific objective 2: Describing and displaying the current presence of FSC certification in Bosnia and Herzegovina, Croatia, Serbia and Slovenia along 3 dimensions: FM certification, chain of custody (COC) certification, and Trademark (TM) license agreements. This specific objective is achieved by literature review and data mining via secondary sources.
Research question 2: What is the current state of FSC certification in Bosnia and Herzegovina, Croatia, Serbia and Slovenia?

Specific objective 3: Studying and delivering possible solutions for FSC certification growth in Bosnia and Herzegovina, Croatia, Serbia and Slovenia, by considering current obstacles and opportunities present in each separate country. This specific objective is achieved by combination of data mining via secondary sources and interviews with experts via questionnaires.

Research question 3: How can FSC certification grow in Bosnia and Herzegovina, Croatia, Serbia and Slovenia?

1.2 Thesis structure

Chapter 1, i.e. this chapter, introduces the research topics, objectives and questions. It also describes the thesis structure. Chapter 2 describes the methodologies adopted for the research, while Chapters 3 and 4 provide a general presentation of Forest Stewardship Council and the 4 targeted countries in terms of demographic and economic indicators. This is meant to provide readers with a better understanding of FSC and the study area in order to introduce them to specific research results, presented and discussed in Chapter 5. In 5.1 key figures for the forest and forestry sectors in the four targeted countries are presented via comparative analysis mostly building on secondary data. In 5.2 an overview of the state of the art and recent developments of FSC certification in the targeted countries is provided with specific reference to three main dimensions, i.e. FM and COC certificates, as well as TM license agreements. Finally, in 5.3 the main barriers to FSC certification are presented and discussed vis-à-vis possible solutions for addressing them as identified based on inputs provided by key stakeholders and experts interviewed for the aims of this research. Chapter 6 draws conclusions and highlights a few distinct and possible directions for the future FSC certification expansion in the considered countries.

2 MATERIALS AND METHODS

Chapter 2 provides information on materials and methods adopted for the development of the research activities.

2.1 Specific research objective 1

For the purpose of achieving the specific research objective 1, an extensive scientific and grey literature review and data mining via secondary sources was undertaken. As a first step, a list of relevant figures and indicators -such as forest area, tree species, etc.- for which data was to be collected has been defined. Data was largely collected from the latest available and relevant publications of: (i) national statistical offices, i.e., Agency for Statistics of Bosnia and Herzegovina, Croatian Bureau of Statistics, Statistical Office of the Republic of Serbia, and Statistical Office of the Republic of Slovenia; (ii) publications from the public forest enterprises within targeted countries, i.e., Forests of Republic of Srpska (*Шуме Републике Српске)*, Croatian forests (*Hrvatske šume*), Serbia forests (*Србијашуме*), Vojvodina forests (*Vojvodina šume*) and Slovenian state forests (*Slovenski državni gozdovi*); (iii) available national forest inventories (NFI) for the targeted countries; (iv) publications and reports by different international institutions operating in (or with a link to) the forestry sector, namely the Food and Agriculture Organization of the United Nations (FAO) -with particular reference to National reports developed for the last FAO Forest Resource Assessment (FRA)-, the World Bank and the European Forest Institute (EFI); (v) relevant research papers from international scientific database Science Direct using key words ("Country name") AND ("private forest owners" OR "private forests"); and (vi) online news articles via Google search. All the findings were analyzed and recorded in dedicated spreadsheets that have been used for data elaborations and analysis that are reported within this thesis. Data analysis was mainly conducted under the form of basic statistics, largely intended to describe data distribution and trends, as well as descriptive statistics. Elaborations were performed via Microsoft Excel version 16.20.

In order to integrate and complement data available through the above-reported secondary sources, primary data collection was also undertaken. This was achieved by contacting forest experts via email correspondence and video calling and directly asking them for missing data. Most approached experts were appropriate members of national Ministries,

employees of forest managing companies, or senior scientists at forest faculties within targeted countries.

All of the collected data for the specific research objective 1 is available in this thesis under the chapter 5.1, accompanied by brief qualitative descriptions which present and compare figures for appropriate indicators.

2.2 Specific research objective 2

As regards data portraying the presence of certificate-holders and other certification-related figures in the four targeted countries, reference has been made to available online resources provided by forest certification initiatives. In particular the official FSC website as well as its database (Figure 1) have been explored. Specific research objective 2 was achieved exclusively by secondary data collection.

The first step was defining variables such as certified forest area, number of FM/COC certificates, year of 1st certificate issue, etc., for which data was to be collected. Then, through the database, data have been searched per country by running separate searches. The “Certificate Search” session of the public database was used. Results for each certificate were further explored and saved in dedicated spreadsheets for further elaborations. Data on TM license were searched by means of the dedicated “Trademark service license holder search” session of the public database. Results were saved in a dedicated spreadsheet for further discussion.

As for objective 1, data analysis was mainly conducted under the form of basic statistics, largely intended to describe data distribution and trends, as well as descriptive statistics. Elaborations were performed via Microsoft Excel version 16.20. All of the collected data for the specific research objective 2 is available in this thesis under the chapter 5.2, accompanied by brief qualitative descriptions which present and compare figures for appropriate indicators.

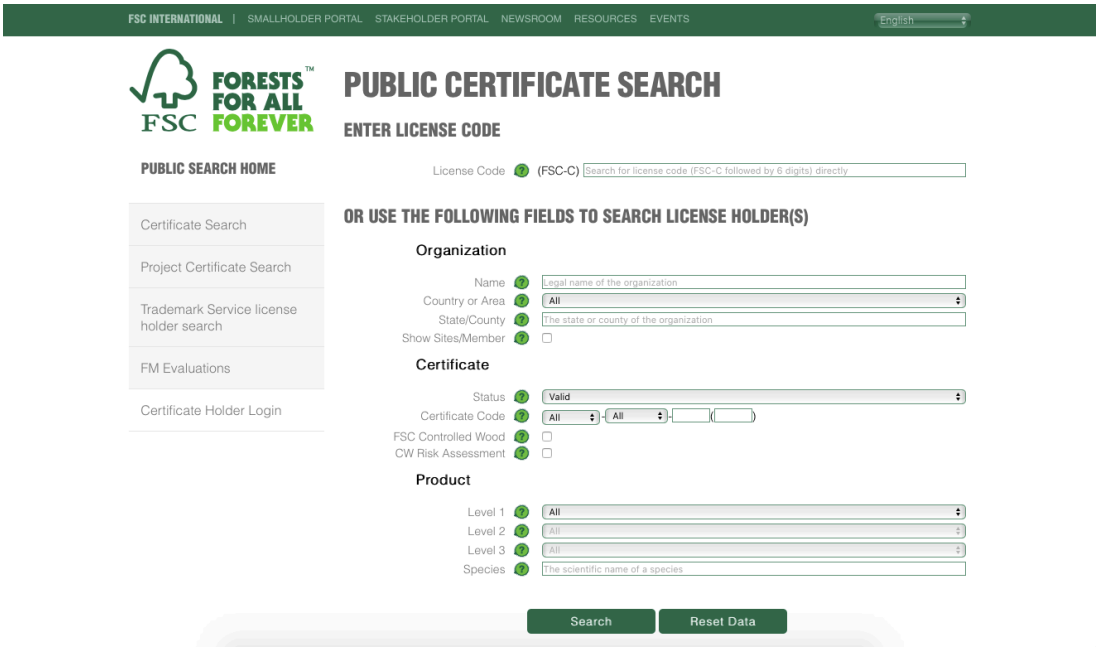


Figure 1 Public FSC Database

Source: FSC (2020a)

2.3 Specific research objective 3

To understand barriers and opportunities of FM certification growth in considered countries, a questionnaire was designed and distributed to a defined panel of experts, with the intention to cover multiple interests and perspectives on forest management within the countries. Limitations of this approach are discussed in sub-chapter 2.4. From each targeted country three experts were selected, one from the academia, one from the State forest enterprises, and one from an association of PFOs, from a list of contacts identified based on both pre-existing contacts and outcomes of the literature review. Selected experts were preliminarily contacted via e-mail, to introduce the research topic and aims, as well as to receive a link leading to the online questionnaire created using Google Forms to be performed via their remote connection devices.

The questionnaire was semi-structured and organized into two main sessions. First session focused on problems/barriers and opportunities associated with forest management and certification for private forest owners, while second session presented two models as possible solutions to be discussed. A preview of the full questionnaire may be found in Annex 1.

To understand barriers and opportunities of COC certification growth in considered countries, additional two separate questionnaires were designed. The first of the two questionnaires was delivered to the accredited certification bodies that offer their services in the considered countries. In total, 6 active certification bodies that cover more than 90% of the market in the targeted countries were considered and contacted. The second questionnaire was delivered to current FSC COC certificate holders: 10 certificate holders were randomly selected from each of the four countries, using a RANDBETWEEN function in Microsoft Excel.

The questionnaire designed for accredited certification bodies focused on exploring common barriers that companies which consider becoming certified experience, as well as the most frequent/common non-conformities of already certified companies. It also presented some solutions for COC certification growth, and certification bodies were asked to comment on them. A copy of the full questionnaire may be found in Annex 2. The questionnaire designed for current FSC COC certificate holders focused on the main observed benefits and costs for certified companies, effects of FSC certification of business activities, FSC brand awareness amongst their customers, etc. A copy of the full questionnaire may be found in Annex 3. All communication was achieved via email correspondence. Due to the very low response rate from the current FSC COC certificate holders from all four countries, this questionnaire was finally not considered in results and was replaced by literature review with the objective to build upon the results of surveys with accredited certification bodies, and better describe expansion possibility for FSC COC certification given the specific conditions of each country.

Data analysis was mainly conducted under the form of basic statistics, largely intended to describe data distribution and trends, as well as descriptive statistics. Elaborations were performed via Microsoft Excel version 16.20. All of the collected data for the specific research objective 3 is available in this thesis under the chapter 5.3.

2.4 Limitations of the research

Collected data by the means of primary or secondary data collection, comes from various national and international sources that follow different methodologies for data collection. Experts' estimations were used to complete some publicly unavailable data. While this data is useful for general observations, it is unknown how comparable and exact it is, and should

be used with caution. Compensating for the lack of data harmonization, in some cases FAO data is also included for targeted countries, which is supposed to be harmonized to some extent, as FAO has a clear set of definitions for all variables that are used for data collection. It should be noted that FAO data is not without its faults either, as often they use estimation values when real values are not available.

None of the data collected from the official national statistical offices nor publications from forest management companies includes estimations of illegal cut or gray economy, and this is considered as another big limitation, as the officially registered cut does not provide accurate insight. Numerous online articles point to the fact that considered countries are dealing with illegal cut, most notably in private forests.

In some cases, data collection for Bosnia and Herzegovina was not possible as sometimes there is no singular forestry data at the national level, due to the structure of Bosnia and Herzegovina which consists of 2 entities and an autonomous district. Although effort is taken to create meaningful data for the national level, often forestry related data is only available on a level of entities.

Public FSC database is continuously updated and it should be noted that presented figures in this thesis refer to a current state of FSC certification in targeted countries during the time of conducting this research. The state of FSC certification is likely to change to an extent, during the time of reading.

Limitations deriving from Covid-19 measures imposed severe constraints, impeding face-to-face interviews as well as turning the contacts with experts problematic and finally affecting the total number of interviews that were actually performed. Although it might be assumed that the interviews allow gaining an in-depth view of the addressed topics and provide useful information and insights, it cannot be denied that they could have involved a larger group of stakeholders, making results even richer and more complete.

3 FOREST STEWARDSHIP COUNCIL

The Forest Stewardship Council A.C. is a not for profit, non-government, international organization established in 1993 with the mission to promote environmentally appropriate, socially beneficial, and economically viable management of forests (FSC, 2015a). Environmentally appropriate FM envisions production of timber and non-timber forest products in a way that maintains forest biodiversity and productivity. Socially beneficial FM ensures that both local people and people on global scale enjoy the long-term benefits provided by well-managed forests. Economically viable FM dictates that financial profit shall not be made at the expense of forest resources or affected communities. To achieve its mission, FSC provides a system for a voluntary, independent, third party certification based on 10 Principles and 70 Criteria. The ten FSC Principles are the foundation of FSC certification scheme and they include: Compliance with Law; Workers Rights and Employment Conditions; Indigenous Peoples' Rights; Community Relations; Benefits from the Forest; Environmental Values and Impacts; Management Planning; Monitoring and Assessment; High Conservation Values; Implementation of Management Activities (FSC, 2015a). Each of these principles has a defined set of Criteria which are created in order to judge if the principles have been fulfilled.

FSC is a standard setting body, with two main sets of standards: FM standards and COC standards. FM standards are developed for any forest operator that wishes to comply with good management practices, while COC standards are developed with producers and traders of forest products in mind, for the verification of FSC certified materials and products along the production chain from forests to final consumers (FSC, 2015b). Depending on their nature and needs, companies may hold FM certificate, COC certificate, or both. As of March 2020, there were 1 709 valid FSC FM/COC certificates that covered 210 902 124 ha of forests, and 41 864 valid FSC COC certificates worldwide (FSC, 2020).

The FSC logo is registered and issued under a TM (i.e., Trademark) license. Every organization holding a valid FSC FM or COC certificate has the right to use the FSC logo with a dedicated license number. Such organizations might use the FSC logo in order to communicate that their forest is managed in an environmentally appropriate, socially beneficial, and economically viable way, or that a product - or a part of a product - they produce comes from a forest that is FSC certified. When an organization does not directly

produce FSC certified product, but it does sell it (e.g. retailers), it may wish to make a communication via a media such as a website, radio ad, catalog ad, etc. about their corporate responsibility. In this case, such organization has to issue an official request to FSC in order to be allowed to use FSC logo in their communication, via a dedicated TM License agreement.

While FSC has an International Centre in Bonn (Germany) and national/regional offices around the globe, there is no local or regional FSC representation in any of the 4 targeted countries. For this reason, FSC Italy - an FSC network member - has been asked to provide supporting services for Bosnia and Herzegovina, Croatia, Serbia and Slovenia. Effectively from February 2020, FSC Italy is in charge of providing appropriate market development support services, supporting the growth of FSC, acting as the point of contact for all FSC related inquiries, and offering Trademark Service Programme for all four countries.

4 THE STUDY AREA: GENERAL INFORMATION ABOUT BOSNIA AND HERZEGOVINA, CROATIA, SERBIA AND SLOVENIA

Bosnia and Herzegovina, Croatia, Serbia and Slovenia are young democratic countries situated in the South-east Europe (Figure 2). Forming part of the Republic of Yugoslavia until early 1990s, these 4 Slavic countries today share national borders as well as relatively similar languages. The largest country by area and population is Serbia, while the smallest one is Slovenia. All countries except for Serbia have an open access to the Adriatic Sea, Croatian coast being significantly the longest. All countries share some climatic traits i.e. Continental climate, while also exhibiting some unique climatic conditions. According to the latest available data, all countries are characterized by negative natural increase, while net migration is positive only in Serbia and Slovenia. The oldest country by average age is Slovenia (43,4 years) while the youngest country by average age is Bosnia and Herzegovina (39,5 years). Currently, only Croatia and Slovenia are members of European Union, while Serbia is a candidate country and Bosnia and Herzegovina is a potential candidate country. With the exception of Slovenia which joined Euro area in 2007, the rest of the countries use their own national currencies. Slovenia has the highest Gross Domestic Product (GDP) per capita (22 083 EUR), while Bosnia and Herzegovina has the lowest GDP per capita (4 561,73 EUR). Unemployment rate is the highest in Bosnia and Herzegovina (15,7%) and the lowest in Slovenia (4%). Slovenia has the highest average gross monthly salary (1 806,50 EUR), while Serbia has the lowest average gross monthly salary (583,98 EUR). More detailed quantitative comparison is presented in Table 1 using the latest available data.

Figure 2 Geographical map of considered countries

Source: Google Maps (2020)

Table 1 General data for considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Total area	51 209,2 km² [a]	87 661 km² [j]	88 499 km² [n]	20 273 km² [u]
Land area	51 197 km² [a]	56 594 km² [j]	88 499 km² [n]	20 131 km² [u]
Population	3 500 295 (in 2018) [a]	4 087 843 (in 2018) [k]	6 982 604 (in 2018) [o]	2 094 060 (in 2019) [v]
Ratio of urban vs rural population	 48,2 : 51,8 [bb]	 56,9 : 43,1 [bb]	 56,1 : 43,9 [bb]	 54,5 : 45,5 [bb]
Official language/s	Bosnian, Croatian, and Serbian language [a]	Croatian language [k]	Serbian language [p]	Slovenian language [w]
Neighboring countries and seas	Serbia (E), Montenegro (SE), Adriatic Sea (S), Croatia (N, SW) [a]	Slovenia (W), Hungary (N), Serbia and Bosnia and Herzegovina (E), Adriatic Sea and Montenegro (S) [l]	Hungary (N), Romania (NE), Bulgaria (SE), North Macedonia, Albania and Montenegro (S), Croatia and Bosnia and Herzegovina (W) [n]	Italy (W), Austria (N), Hungary (NE), Croatia (SE), Adriatic Sea (SW) [u]
Climate	Continental and Mediterranean climate [a]	Continental, Mediterranean, and snowy forested climate [l]	Continental climate [q]	Continental, sub-Mediterranean, and Alpine climate [x]
Capital city	Sarajevo [a]	Zagreb [k]	Beograd [p]	Ljubljana [y]
Natural increase	Negative [a]	Negative [k]	Negative [p]	Negative [v]
Net migration	Negative [b]	Negative [b]	Positive [b]	Positive [b]
Average age of a citizen	39,5 years [c]	41,7 years [j]	43,2 years [p]	43,4 years [v]
Currency	Convertible mark (BAM) [a]	Kuna (HRK) [k]	Dinar (RSD) [r]	Euro (EUR) [z]
Exchange rate	1 EUR = 1,96 BAM [d]	1 EUR = 7,60 HRK [m]	1 EUR = 117,52 RSD [s]	n/a
GDP per capita	4 875,51 EUR (in 2018) [e]	12 615 EUR (in 2018) [k]	6 137 EUR (in 2018) [n]	22 083 EUR (in 2018) [v]
GDP real growth rate	3,62% (in 2018) [f]	2,6% (in 2018) [k]	4,4% (in 2018) [n]	1,7% (in 2018) [v]
Most significant sectors contributing to GDP	Wholesale and retail trade (14,02%); Manufacturing	Manufacturing (12,67%); Wholesale and retail trade	Manufacturing (14,5%); Wholesale and retail trade	Manufacturing (20,52%); Trade, transportation and

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
	(13,23%); Public administration and defense (7,37%) (in 2018) [g]	(9,80%); Real estate activities (8,32%) (in 2018) [l]	(11,5%); Real estate activities (7%) (in 2018) [t]	storage, accommodation (18,26%); Public administration, education, human health and social work (10,44%) (in 2018) [aa]
Agriculture, forestry and fishing in GDP structure	5,89% (in 2018) [g]	3,14% (in 2018) [l]	6,3% (in 2018) [t]	2,09% (in 2018) [aa]
Unemployment rate	15,7% (in 2019) [a]	8,4% (in 2019) [k]	13,3% (in 2018) [t]	4,0% (in 2019) [v]
Average gross salary	703,57 EUR (in 2018) [h]	1 111,58 EUR (in 2018) [k]	583,98 EUR (in 2018) [n]	1 806,50 EUR (in 2018) [v]
Corruption perception index (rank)	36/100 (101st out of 180 countries) [i]	47/100 (63rd out of 180 countries) [i]	39/100 (91stout of 180 countries) [i]	60/100 (35th out of 180 countries) [i]
Member of EU	No	Yes	No	Yes

5 RESULTS AND DISCUSSION

5.1 Key figures for the forests and forestry sectors of targeted countries

5.1.1 Forest management approach

FM approaches in Bosnia and Herzegovina, Croatia, Serbia and Slovenia mostly depend on the forest ownership and political setup of each country. In all four countries forests are managed according to legally prescribed forest management plans (FMP) that consider a time frame of 10 years. The next 4 sub-chapters describe FM of each country individually, while Table 2 presents a quantitative comparison between the FM approaches of the four countries.

5.1.1.1 Forest management in Bosnia and Herzegovina

Bosnia and Herzegovina consists of two entities: the Federation of Bosnia and Herzegovina (FBiH) and the Republic of Srpska (RS), plus one autonomous province named Brčko District (BD). There are separate institutions in charge of state-owned forests management in each entity and autonomous region (FAO, 2015). There is no common forest policy nor national forest legislation at the level of Bosnia and Herzegovina (Avidbegović *et al.,* 2015). Such policies partially exist on the levels of the two federations (entities) and autonomous district.

PFOs in Bosnia and Herzegovina are in charge of managing their own forest properties. Avidbegović *et al.* (2015) state that currently PFOs do not hold great potential of adopting innovative FM due to the lack of recognition of private forest ownership category, as compared to state-owned forests at all administrative levels and institutional arrangements.

All state-owned and private forests of Bosnia and Herzegovina have a valid FMP in place. FM approaches and forestry legislation of each entity and autonomous province are described in more detail in the continuation of this sub chapter.

5.1.1.1.1 Forest management in Federation of Bosnia and Herzegovina

FM of state-owned forests in FBiH is decentralized to the level of cantonal governments. There are 10 Cantonal Forest Offices (CFO) that further transfer the management rights of

state-owned forests to Cantonal Forest Management Companies (CFMC[1]). CFOs also provide advice and support to PFOs. CFMCs are in most cases established as public companies and their tasks include the development of FMPs, realization of forest projects, construction and maintenance of forest infrastructure, selling of forest products, forest protection, etc.

PFOs in FBiH are in charge of managing their forest properties. They have to adhere to the prescribed rules of forest afforestation, silviculture activities, and forest protection (Avidbegović *et al.,* 2015).

In FBiH, while FMPs are in use, there is currently no valid forest legislation i.e. Forest Law on Entity's level which directly regulates creation of FMPs. The previous Forest Law from 2002, which was proclaimed invalid by the Constitutional Court of Bosnia and Herzegovina in 2009 (Avidbegović *et al.,* 2015), prescribed that all FMPs in FBiH were to be developed considering a time frame of 10 years and should have been periodically renewed. The general document providing guidelines for the development of FMPs in FBiH was named Forestry program of the Federation *(Šumarski program Federacije)*. This document was created by the Federal Ministry of Agriculture, Water Management and Forestry and all FMPs had to be developed in accordance with this document. For the area of each canton, more specific FMP development documents were created, named Cantonal forest development plan *(Kantonalni šumsko-razvojni plan)*. Finally, state-owned and private forests were managed according to FMPs named Forest management basis *(Šumskogospodarska osnova)*. These FMPs were developed separately for each FM unit of state-owned forests, and one per municipality for private FM. Forest management basis for state-owned forests was developed by CFMCs, while Forest management basis for private forests was developed by CFOs. All state-owned and private forests of FBiH have a valid FMP in place (Avidbegović - pers. com., 2020). All FMPs in FBiH had to be publicly available (Forest Law, 2002).

[1] Unsko-sanske šume Ltd., Srednjobosanske šume Ltd., Forestry company of Zeničko-dobojskog kantona d.o.o, Hercegbosanske šume d.o.o., Šume Tuzlanskog Kantona Jsc., Sarajevo šume Ltd., Bosansko-podrinjske šume Ltd., Forestry company of Županije Zapadnohercegovačke Ltd., Šume Herceg Bosne Ltd., and Šume Hercegovačko-neretvanske Ltd., (FAO, 2015).

5.1.1.1.2 Forest management in Republic of Srpska

FM of state-owned forests in RS is centralized and performed by a public company Forests of Republic of Srpska Jsc. (*Шуме Републике Српске а.д.*). The main tasks of this company include forest protection and conservation, preparation and implementation of planning documents, forestry activities, construction and maintenance of forest infrastructure, etc.

PFOs in RS are in charge of managing their forest properties. Private forests have to be managed with the professional and technical expertise of public company Forests of Republic of Srpska Jsc. (Avidbegović *et al.,* 2015).

According to the current Forest Law, all FMPs in RS are developed considering a time frame of 10 years. The general document for the FMP development in RS is named Forestry program of the Republic *(Šumarski program Republike)* and all FMPs have to be in accordance with it. State-owned and private forests are managed in accordance with FMPs named Forest management basis *(Šumskoprivredna osnova)*. These are developed separately for each FM unit of state-owned forests, and one per municipality for private FM. Additionally, these FMPs may be developed by licensed registered forest companies. All state-owned and private forests of RS have a valid FMP in place (Avidbegović - pers. com., 2020). Forest Law does not explicitly state that all FMPs in RS have to be publicly available (Forest Law, 2008).

5.1.1.1.3 Forest management in Brčko District

There is no public forest company in BD as the majority of forests are owned by PFOs. State-owned forests of BD are under the Department for Agriculture, Forestry and Water Management's authority (FAO, 2015).

The current Forest Law prescribes creation of mandatory 10-yearlong FMPs, named Forest management basis *(Šumskogospodarska osnova)*, for both state-owned and private forests within the BD. These FMPs are created separately for state-owned and private forests by licensed registered forest companies. All state-owned and private forests of BD have a valid FMP in place (Veljančić – pers. com., 2020). Forest Law does not explicitly state that all FMPs in BD have to be publicly available (Forest Law, 2010).

5.1.1.2 Forest management in Croatia

FM of state-owned forests is centralized and performed by a public company Croatian Forests Ltd. (*Hrvatske šume d.o.o.*) This company manages more than 96% of state-owned forests, while the rest is managed by other state bodies or public entities defined by the Republic of Croatia (Croatian Forests Ltd., 2017). The tasks of Croatian Forests Ltd. include the development of FM plans, natural and artificial forest regeneration, afforestation, forest protection, maintenance of forest nurseries, etc.

PFOs in Croatia are in charge of managing their forest properties. Krajter Ostoić *et al.* (2015) list some of the responsibilities of PFOs in Croatia, such as maintenance the natural composition of the forest, supporting the traditional FM systems, forest monitoring, usage of autochthonous species for afforestation, etc. Currently, the main obstacles to FM in private forests include small-scale forestry, poor cadaster and land registry, unsolved property rights, insufficient road infrastructure, absence of an established timber market for PFOs, and missing FMPs for a portion of PFOs (Krajter Ostoić *et al.*, 2015).

According to the current Forest Law of the Republic of Croatia, all FMPs in Croatia are developed considering a time frame of 10 years and should be periodically renewed. The general FMP for forests in Croatia is named Forest management plan of the territory of the Republic of Croatia *(Šumskogospodarska osnova područja Republike Hrvatske)*. This FMP is developed by Croatian Forests Ltd. All other FMPs have to be in accordance with this plan. State-owned forests are managed in accordance with FMPs named Basis of forest unit management *(Osnova gospodarenja gospodarskom jedinicom)*, which are created for each FM unit by one of the 17 responsible FM branches in Croatia. Private forests are managed in accordance with FMPs named Forest management program for private forest owners *(Program gospodarenja šumama privatnih šumoposjednika)*, which are created by licensed companies. All state-owned forests and 67% of private ones in Croatia have a valid FMP in place (Grgas – pers. com., 2020). Croatia is the only country out of the considered that does not have FMPs in place for the total forest area. This is because the Forest Law does not prescribe mandatory creation of FMPs for private forests, instead, PFOs are supposed to initiate this process. In total, about 92% of forests in Croatia have a valid FMP in place. All FMPs in Croatia should be publicly available (Forest Law, 2020).

5.1.1.3 Forest management in Serbia

FM of state-owned forests is centralized and performed by two public companies: Serbia Forests Ltd. (*Србијашуме д.о.о.*) and Vojvodina Forests Ltd. (*Vojvodinašume d.o.o.*). Vojvodina Forests Ltd. is in charge of managing state-owned forests in Vojvodina province, an autonomous province within Serbia, while Serbia Forests Ltd. manages the rest of the state-owned forests in Serbia. These two public companies jointly manage nearly 89% of state-owned forests, while the rest is managed by other state bodies or other public entities established by the Republic of Serbia (Nonić *et al.,* 2015). Their tasks include FM, protection of forests, creation of FMPs, supporting PFOs, etc.

PFOs in Serbia are in charge of managing their forest properties. Alternatively, management rights may be conferred to private forest owner's association (PFOA). Regardless of the management type, their duties include recording conducted works, recording changes in forest, forest guarding, forest roads maintenance, obtaining cutting permits, getting the trees marked before the harvest, etc. (Nonić *et al.,* 2015). Nonić et al. (2015) additionally state that a large number of regulations and restrictions makes PFOs in Serbia heavily dependent on either Department of Forests of the Republic of Serbia or PFMCs.

It is worth mentioning that due to the ongoing restitution process, church and religious communities appeared as a new category of forest owners. Current forestry legislation does not yet recognize this category as a separate type of ownership. However, unlike FM in private forests, FM in church forests is completely independent of PFMCs, meaning that all forestry operations may be conducted without any influence or permissions from a PFMCs (Nonić *et al.,* 2015).

According to the current Forest Law valid for the entire area of Republic of Serbia (including the autonomous province Vojvodina), all FMPs are developed considering a time frame of 10 years. The general document for the development of FMPs in Serbia is named Forest area development plan *(Plan razvoja šumske oblasti)*. All FMPs have to be developed in accordance with this document. State-owned forests are managed in accordance with FMPs named Basis of forest management *(Osnova gazdovanja šumama)*. Private forests are managed in accordance with FMPs named Forest management program *(Program gazdovanja šumama)*. FMPs for both state-owned and private forests may be created by a public person (i.e. Serbia Forests Ltd. or Vojvodina Forests Ltd.) or a licensed registered

forest company. All state-owned forests and 20% of private forests in Serbia have a valid FMP in place, developed for a time frame of 10 years. For the remaining 80% of private forests, temporary one-year FMPs are in place (Ostoić – pers. com., 2020). It may be concluded that in total, 100% of forests in Serbia have a valid FMP in place. All FMPs in Serbia should be publicly available (Forest Law, 2010b).

5.1.1.4 Forest management in Slovenia

FM of state-owned forests is centralized and performed by the public company Slovenian State Forests Ltd. (*Slovenski državni gozdovi d.o.o.*). This company is in charge of felling, extraction, transport and selling of wood, forest trade, maintenance of forest infrastructure, forest protection, encouraging the development of wood processing industry, etc. Local municipalities manage municipality-owned forests.

PFOs in Slovenia are in charge of managing their forest properties. In most cases, individual PFO and other family members perform most of the work considering private FM. Currently, main obstacles to FM in private forests include small size and fragmentation of properties, poor openness of forests with roads, unknown location of plots, low timber prices, too expensive forest operations, etc. (Krč *et al.,* 2015).

According to the national Forest Law, all FMPs in Slovenia are developed considering a time frame of 10 years and should be periodically renewed. The general document for the development of FMPs in Slovenia is named National Forest Program *(Nacionalni gozdni program)*. This document is developed by the public company Slovenia Forest Service (*Zavod za gozdove Slovenije*). All FMPs have to be developed in accordance with this document. State-owned and private forests are managed in accordance with FMPs named Forest management plan of the forest management area *(Gozdnogospodarski načrt gozdnogospodarskega območja)*, which are also developed by Slovenia Forest Service. These FMPs are created for each FM branch, 14 in total. Unlike FMPs in Bosnia and Herzegovina, Croatia and Serbia, FMPs in Slovenia are created to consider both state-owned and private forests within one plan. All FMPs in Slovenia should be publicly available (Forest Law, 1993).

Table 2 Forest management in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
FM according to mandatory 10-year FMP	Yes [a,b,c]	Yes [e]	Yes [f]	Yes [g]
Public companies in charge of state-owned FM (local name)	FBiH - 10 CFMCs RS - Forests of Republic of Srpska Jsc. (Шуме Републике Српске а.д.) [b,d]	Croatian Forests Ltd. (Hrvatske šume d.o.o.) [e]	Serbia Forests Ltd. (Србијашуме д.о.о.) and Vojvodina Forests Ltd. (Vojvodinašume d.o.o.) [f]	Slovenian State Forests Ltd. (Slovenski državni gozdovi d.o.o.) [g]
% of total forest area with valid FMP in place	 100% [j]	 92,10% [e,h]	 100% [i]	 100% [g]
% of state-owned and municipality-owned forest area with valid FMP in place	 100% [a,b,c]	 100% [e]	 100% [f,i]	 100% [g]
% of private forest area with valid FMP in place	 100% [j]	 67,04% [h]	 100% [i]	 100% [g]

5.1.2 Total forest area

According to the most recent data produced by national statistical offices, NFIs, and FMPs, Bosnia and Herzegovina has the highest total forest cover (2 904 600 ha), while Slovenia has the lowest one (1 184 042 ha), nonetheless Slovenia has the highest relative forest cover (58%), while in Serbia the lowest one (25%). Forest cover is expanding in all four countries.

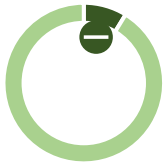
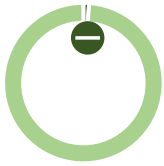
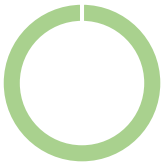
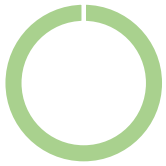
Food and Agriculture Organization (FAO) uses its own set of definitions and classification metrics for forest resources, different from the four considered countries, and as a consequence it reports different figures regarding the forest area. For example, in Croatia a forest is defined as land covered by forest trees formed as forest stand over an area larger than 10 ars (1 ar = 100 m^2) (FAO, 2014a), in Serbia as every area over 0,05 ha covered with forest trees in the form of stands (FAO, 2014b), while FAO defines forest as land spanning over more than 0,5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent or trees able to reach these thresholds in situ (FAO, 2014a). Another reason for differences in data is due to the fact that FAO reports forestry related data in 5-year intervals (e.g. 2005, 2010, 2015…), and in case of a missing figure for a given year, FAO estimates figures. This can reduce the accuracy of reported forestry data. According to FAO, Serbia has the highest forest cover (2 255 000 ha), while Slovenia has the lowest forest cover (1 248 000 ha). Additionally, 62% of Slovenia is covered with forests, while 25% of Serbia is forested.

According to data coming from both national sources and FAO, Bosnia and Herzegovina has the highest rate of forest per capita, while Serbia has the lowest one. Slovenia is the only country out of the four considered, sharing less than 1% of the total European forest area. Considering forest resources of all European countries, according to the World Bank database (created using FAO data), Serbia ranks on the 22nd place (the highest position for the four countries) while Slovenia ranks on 31st place (the lowest position for the four countries) in Europe. According to another World Bank's indicator which measures the contribution of forest area in total national land area, Slovenia ranks 3rd out of all European countries (the highest position of four countries), while Serbia ranks on 29th place (the lowest position of four countries). Finally, one of the consequences of independence wars fought more than 2 decades ago, are mined forests, still present in Bosnia and Herzegovina and Croatia, but not present in Serbia and Slovenia. These areas are forbidden to enter until demined, and therefore decrease the possible uses of forests. Mined forest area in Bosnia and Herzegovina is significantly larger than in Croatia and it accounts for approximately 8,7% of the total forest area, unlike only 1,2% in Croatia. More detailed quantitative comparison between the four countries is presented in Table 3 using the latest available data.

Table 3 Total forest area in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Total forest land area (national data)	3 231 500 ha (2009) [a]	2 759 039,05 ha (in 2016) [f]	2 634 800 ha (in 2009) [k]	1 193 750 ha (in 2018) [i]
Forest area (n.d.)	2 904 600 ha (2006-2009) [a]	2 492 676,33 ha (in 2016) [f]	2 252 400 ha (in 2009) [k]	1 177 244 ha (in 2018) [i]
Share of forest area in a total land area (n.d.)	 56,73%	 44,04%	 25,45%	 58,48%
Forest area per capita (n.d.)	0,83 ha	0,61 ha	0,32 ha	0,56 ha
Other wooded land (n.d.)	317 800 ha (2006-2009) [a]	266 362,72 ha (in 2016) [f]	382 400 ha (in 2009) [k]	16 506 ha (in 2018) [i]
Production forest area (n.d.)	2 377 700 ha (2006-2009) [a]	1 425 809,46 ha (2016) [f]	1 787 000 ha (in 2020) [q]	1 062 974 ha (in 2018) [i]
Share of production forests in forest area (n.d.)	 81,86%	 57,20%	 79,34%	 90,29%
Total forest land area (FAO)	2 734 000 (in 2015) [b]	2 491 000 ha (in 2015) [g]	2 735 000 ha* (in 2015) [h]	1 271 000 (in 2015) [j]
Forest area (FAO)	2 185 000 ha (in 2015) [b]	1 922 000 ha (in 2015) [g]	2 255 000 ha* (in 2015) [h]	1 248 000 ha (in 2015) [j]
Share of forest area in a total land area (FAO)	 42,68%	 33,96%	 25,48%	 61,99%
Forest area per capita (FAO)	0,62 ha	0,47 ha	0,32 ha	0,60 ha
Other wooded land (FAO)	549 000 ha (in 2015) [b]	569 000 ha (in 2015) [g]	480 000 ha* (in 2015) [h]	23 000 ha (in 2015) [j]

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Production forest area (FAO)	1 226 000 ha (in 2015) [b]	1 548 000 ha (in 2015) [g]	1 787 000 ha (in 2015) [h]	555 000 ha (in 2015) [j]
Share of production forests in forest area (FAO)	 56,11%	 80,54%	 79,25%	 44,47%
% of total forest cover in Europe	1,15% [c,e]	1,01% [c,e]	1,43% [c,e]	0,66% [c,e]
Rank in Europe according to forest area in ha	25th out of 51 countries [c]	29th out of 51 countries [c]	22nd out of 51 countries [c]	31st out of 51 countries [c]
Rank in Europe according to share of forest cover	10th out of 51 countries [d]	21st out of 51 countries [d]	29th out of 51 countries [d]	3rd out of 51 countries [d]
Total forest cover change in last two decades	Increase [a]	Increase [g]	Increase [h]	Increase [j]
Mined forest area	253 664,2 ha (in 2018) [m,n,o]	32 000 ha (in 2020) [l]	0 ha [q]	0 ha [p]
Share of mined forest area as % of forest area (n.d.)	 8,73%	 1,16%	 0 %	 0%

*Modified data, Kosovo forest and other wooded land area excluded from final figures

5.1.3 Forest ownership structure and restitution process

While in Bosnia and Herzegovina, Croatia and Serbia forest ownership is divided between state and private owners, in Slovenia the forest ownership is divided between state, municipalities and private owners. State owns most forest area in Croatia (76%) and the least amount of forest area in Slovenia (21%). Only in Serbia and Slovenia more than 50% of forest area is privately owned. Soon after the proclamation of independence in the early 1990s, all four countries started the process of restitution. The process of returning the forest land to private individuals is still ongoing in all four countries, due to numerous difficulties in proving the previous ownership of a forest land (Živojinović *et al.,* 2015). While in Bosnia

and Herzegovina no significant changes in forest ownership structure are expected after the completion of the restitution process (Avdibegović *et al.,* 2015), Krajter Ostoić *et al*. (2015) stated that in Croatia, the restitution process is ongoing for additional 300 000 ha of forest land which could significantly change the forest ownership structure of the country. In Serbia, apart from the changes in the forest ownership structure, the restitution process brought about new management approaches in a form of new independent forest companies for FM (Nunić *et al.,* 2015). Krč *et al.* (2015) state that the process of restitution already made significant changes in the forest ownership structure of Slovenia, raising the percentage of privately-owned forests from 50% in ex-Yugoslavia to 75% nowadays. A more detailed quantitative comparison between four countries is presented in Table 4 using the latest available data.

Table 4 Forest ownership structure in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
State-owned forests	2 262 050 ha (2006-2009) [a]	2 097 318,16 ha (in 2016) [b]	963 458 ha (in 2017) [c]	244 473 ha (in 2018) [d]
Private forests	969 450 ha (2006-2009) [a]	661 720,89 ha (in 2016) [b]	1 274 053 ha (in 2017) [c]	901 038 ha (in 2018) [d]
Municipality-owned forests	n/a	n/a	n/a	31 733 ha (in 2018) [d]
Ratio of state-owned vs private forests	 70% : 30% [a]	 76% : 24% [b]	 43% : 57% [c]	 21% : 76% [d]
Restitution effect on forest ownership structure	Minor [e]	Potentially significant [e]	Significant [e]	Significant [e]

5.1.4 Private forest owners

The exact number of PFOs in Bosnia and Herzegovina (Gluck *et al.,* 2011) and Croatia (Grgas – pers. com., 2020) is not known. As for the former, experts predict around 500 000 owners and co-owners, while the PFOs register of Croatia currently contains information for 67% of private forest area, owned by 756 231 owners and co-owners. Based on official

cadaster in Serbia (without accuracy updating) there are around 1 100 000 forest owners and co-owners (Glavonjić – pers. com., 2020), while in Slovenia the number of PFOs is estimated around 489 000. The largest average size of forest property is found in Slovenia (3,81ha), while the smallest one in Bosnia and Herzegovina (0,5ha). The only directly comparable category in terms of forest sizes are forests smaller than 1ha. A high proportion of PFOs in Croatia, i.e. 85% own a forest of such small size, while significantly lower proportion of PFOs in Slovenia, i.e. 53% own forest of such size.

Pezdevšek Malovrh *et al.* (2015) argue that in ex-Yugoslavia, various ownership categories, while allowed, were not taken into consideration or were not separately identified by forest policies. This resulted in a few existing policies to guide PFOs after the break-up of the former country and partially can be seen even nowadays. A positive way in which PFOs may exchange ideas and knowledge is by formation of PFOAs. Currently there are 54 registered PFOAs in Croatia, 26 in Slovenia, 18 in Serbia, and only 2 in Bosnia and Herzegovina. Therefore, it is not surprising that according to Gluck *et al.* (2011), one half of respondents in Bosnia and Herzegovina were willing to engage in a creation of PFOA, as compared to one third in Croatia, and only one quarter in Serbia. More detailed quantitative comparison between the four countries is presented in Table 5 using the latest available data.

Table 5 Private forest owners in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Number of PFOs and co-owners	500 000 (in 2011) [l, j]	756 231 (in 2020) [a]	1 100 000 (in 2020) [d]	489 000 (in 2005) [g]
Every __ citizen owns/ co-owns forest property	7th	6th	7th	5th
Average size of private forest	0,50 ha [i]	1,38 ha [b]	1,27 ha [e]	3,81 ha [h]
Structure of PFOs regarding their forest area				
Owning less than 1ha	64% [j]	85,31% [a]	72,33% [e]	52,69% [h]
1,01 - 5 ha	25,75% [j]	13,23% [a]	26,5 % [e]	29,69% [h]
5,01 - 10 ha	10% [j]	1,02% [a]		9,02% [h]
10,01 - 30 ha		0,29% [a]	1,12% [e]	6,64% [h]
30,01 - 100 ha		0,06% [a]	0,05% [e]	1,60% [h]

Over 100ha		0,08% [a]		0,36% [h]
Number of PFOAs	2 (in 2020) [k]	54 (in 2020) [c]	18 (in 2020) [l]	26 (in 2014) [f]

5.1.5 Growing stock and annual increment

According to the most recent national forestry data, Bosnia and Herzegovina has the largest growing stock (435 million m^3), while Slovenia has the smallest one (355.3 million m^3) among of the four countries. On the other hand, FAO data shows that Serbia has the largest growing stock (418 million m^3), while Bosnia and Herzegovina has the smallest growing stock out of the four countries. The differences that arise from the two sources of data are again due to different methodologies for data collection as well as to the fact that FAO still does not consider the preliminary findings of the second NFI of Bosnia and Herzegovina which offers significant updates. Slovenia has the largest growing stock per capita both according to Slovenia forest service and FAO, while Serbia has the smallest growing stock per capita, according to both Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia and FAO. Beech (*Fagus sylvatica*) is the predominant tree species in all four countries, with the largest share in Bosnia and Herzegovina (49%) and the smallest share in Serbia (29%). Bosnia and Herzegovina and Slovenia have a higher share of conifers within their total growing stock as compared to Croatia and Serbia, where conifers make only a bit over 10% of growing stock. Bosnia and Herzegovina has the highest annual increment of growing stock (11.2 million m^3), while Slovenia has the lowest annual increment (8,8 million m^3). More detailed quantitative comparison between four countries is presented in Table 6 using the latest available data.

Table 6 Growing stock and annual increment in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Total growing stock (national data)	435 000 000 m^3 (2006 – 2009) [a]	418 618 277 m^3 (in 2016) [c]	362 487 417,5 m^3 (in 2009) [e]	355 331 892 m^3 (in 2018) [h]
Total growing stock per capita (n.d.)	124,28 m^3	102,41 m^3	51,91 m^3	169,69 m^3
Total growing stock (FAO)	358 000 000 m^3 (in 2015) [b]	414 940 000 m^3 (in 2015) [d]	418 000 000 m^3 (in 2015) [f]	406 100 000 m^3 (in 2015) [i]
Total growing stock per capita (FAO)	102,28 m^3	101,51 m^3	59,86 m^3	193,93 m^3

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Growing stock -most represented tree species by area	Beech (48,60%); Fir (19,55%); Norway spruce (13,97%); Sessile oak (3,35%) … (in 2000) [b]	Beech (37,22%); Pedunculate oak (11,55%); Sessile oak (9,38%); Common hornbeam (8,39%); European silver fir (7,90%); Narrow-leafed ash (3,90%); Spruce (2,29%) … (in 2016) [c]	Beech (29,4%); Turkey oak (15,3%); Birch, aspen and black locust (9,9%); Sessile oak (7,7%); Hungarian oak (7,1%); Pine tree (5,6%); Hornbeam (5,3%); Spruce (3,8%); Poplar (2,1%) … (in 2007) [g]	Beech (32,6%); Spruce (30,5%); Fir (7,4%); Sessile oak (7,1%); Scotch Pine (5,5%) … (in 2018) [h]
Broadleaves vs conifers	 62,3 : 37,7 [b]	 86,9 : 13,1 [d]	 87,7 : 12,3 [g]	 55,1 : 44,9 [h]
Total annual increment (n.d.)	11 182 000 m^3 (2006 – 2009) [a]	10 146 149 m^3 (in 2016) [c]	9 079 772,8 m^3 (in 2009) [e]	8 800 536 m^3 (in 2018) [h]

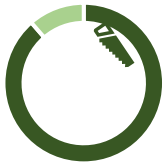
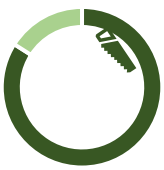
5.1.6 Annual cut

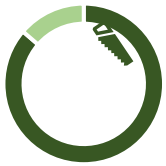
Presented figures for current cut in state-owned, but especially in private forests do not consider illegal logging and therefore are not fully representative of the real situation. Illegal cut is significant in Bosnia and Herzegovina (Dautbašić, 2020), Croatia (Kavran, 2017), as well as Serbia (Glavonjić – pers. com., 2020). Data for Bosnia and Herzegovina is potentially unreliable, since there is no singular source of information on the country level, rather each entity provides data separately. Data for achieved cut in Brčko District is not known nor included here, nor is the data from Canton Hercegovačko-neretvanskom as this Canton did not provide appropriate data to data collecting body. Due to the lack of information regarding the allowable cut in Bosnia and Herzegovina, a full comparison only includes Croatia, Serbia and Slovenia. According to the collected data, Croatia is achieving largest quantities of annual cut (6,8 million m^3), while Serbia is achieving smallest quantities of annual cut (3,3 million m^3). Serbia is cutting significantly below the total prescribed annual allowable cut, mostly due to low officially recorded cut in private forests. In fact, both Croatian and Serbian PFOs are officially cutting less than a third of allowable cut, while in Slovenia PFOs cut significantly more – 86 % of allowable cut. In all considered countries, annual allowable cut

is set below annual increment, and therefore forest growth in ensured. More detailed quantitative comparison between four countries is presented in Table 7 using the latest available data.

Table 7 Annual cut and production of forest products in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Total annual allowable cut	**FBiH** 2 961 767 m^3 (in 2018) [a] **RS** – Data not available	8 037 172,20 m^3 (2016 – 2025) [d]	5 937 819 m^3 (in 2015) [j]	6 837 356 m^3 (in 2018) [f]
Total achieved annual cut	**FBiH** - 2 552 625 m^3 (in 2018) [b] **RS** - 3 224 288 m^3 (in 2018) [c] **Together** – 5 776 913 m^3	6 789 062 m^3 (in 2018) [e,g]	3 268 857 m^3 (in 2018) [i]	6 060 959 m^3 (in 2018) [f]
Achieved total annual cut as % of total annual allowable cut	Data not available	 84,47%	 55,05%	 88,64%
Annual allowable cut in state-owned forests	Data not available	6 472 176,50 m^3 (2016 – 2025) [d]	2 794 595 m^3 (in 2015) [j]	1 416 190,60 m^3 (2011 – 2020) [h]
Achieved annual cut in state-owned forests	**FBiH** - 2 382 977 m^3 (in 2018) [b] **RS** - 2 743 411 m^3 (in 2018) [c] **Together** – 5 126 388 m^3	6 327 827 m^3 (in 2018) [e]	2 347 387 m^3 (in 2018) [i]	1 724 943 m^3 (in 2018) [f]
Achieved annual cut as % of annual allowable cut (state-owned forests only)	Data not available	 97,77%	 84,00%	 121,80%
Annual allowable cut in private forests	Data not available	1 564 995,70 m^3 (2016 – 2025) [d]	3 316 212 m^3 (in 2015) [j]	4 959 324,80 m^3 (2011 – 2020) [h]

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Achieved annual cut in private forests	**FBiH** – 169 648 m^3 (in 2018) [b] **RS** - 480 877 m^3 (in 2018) [c] **Together** – 650 525 m^3	461 235 m^3 (in 2018) [g]	921 470 m^3 (in 2018) [i]	4 281 059 m^3 (in 2018) [f]
Achieved annual cut as % of annual allowable cut (private forests only)	Data not available	 29,47%	 27,79%	 86,32%

5.1.7 Production of forest products

Croatia officially produced the largest quantity of primary forest products in 2018 (5,4 million m^3), while Serbia produced the lowest one (2,9 million m^3) out of the four considered countries. Serbia is the most efficient country in terms of conversion from felled timer into primary forest products with only 11% of input volume wasted as residues, while in Bosnia and Herzegovina 29% of felled timber became residues. The main wood assortment in Bosnia and Herzegovina, Croatia and Slovenia is roundwood, while in Serbia it is fuelwood. Sawlogs, veneer logs and fuelwood are the largest categories of primary timber production in the four countries.

Considering the production of secondary processed forest products measured in cubic meters, sawnwood and wood chips and particles are the most produced forest product in the four countries. The rest of the wood assortments vary in each country. Considering the production of secondary processed forest products measured in tonnes, other paper and paperboard is the only forest product category included within top 5 largest production categories in all four countries, while the rest of the forest product categories differ per country. More detailed quantitative comparison between the four countries is presented in Table 8 using the latest available data.

Table 8 Production of forest products in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Total production of primary forest products	4 085 934 m^3 (in 2018) [a]	5 390 000 m^3 (in 2018) [b]	2 921 097 m^3 (in 2018) [c]	5 146 000 m^3 (in 2018) [d]
Total production / total cut	0,71	0,79	0,89	0,85
Production of primary forest products - largest categories (national data)	Saw logs and veneer logs (47,60%); fuelwood (32,44%); cordwood (14,22%); mining wood (3,37%) (in 2018) [a]	Saw logs and veneer logs (49,63%); fuelwood (40,37%); pulpwood (9,89%) (in 2018) [b]	Fuelwood (56,33%); saw logs, veneer logs and pulp wood (43,67%); (in 2018) [c]	Saw logs and veneer logs (55,05%); fuelwood (23,30%); pulpwood (19,92%) (in 2018) [d]
Main primary forest product	Roundwood [a]	Roundwood [b]	Fuelwood [c]	Roundwood [d]
***5 largest primary production categories, by quantity (FAO)* (in 2018) [c]**				
1.	Sawlogs and veneer logs (C)	Fuelwood (NC)	Fuelwood (NC)	Sawlogs and veneer logs (C)
2.	Fuelwood (NC)	Sawlogs and veneer logs (NC)	Sawlogs and veneer logs (NC)	Fuelwood (NC)
3.	Sawlogs and veneer logs (NC)	Pulpwood (NC)	Wood residues	Wood residues
4.	Pulpwood (C)	Sawlogs and veneer logs (C)	Sawlogs and veneer logs (C)	Pulpwood (C)
5.	Other industrial roundwood (C)	Pulpwood (C)	Fuelwood (C)	Pulpwood (NC)
***5 largest secondary production categories, by quantity in m^3 (FAO)* (in 2018) [c]**				
1.	Sawnwood (NC)	Sawnwood (NC)	Sawnwood (NC)	Sawnwood (C)
2.	Sawnwood (C)	Wood chips and particles	Particle board	Wood chips and particles
3.	Wood chips and particles	Sawnwood (C)	Wood chips and particles	Sawnwood (NC)
4.	Plywood	Particle board	Sawnwood (C)	Plywood
5.	Veneer sheets	Veneer sheets	Hardboard	Veneer sheets
***5 largest secondary production categories, by quantity in tonnes (FAO)* (in 2018) [c]**				
1.	Wood pellets	Other paper and paperboard	Other paper and paperboard	Other paper and paperboard
2.	Other paper and paperboard	Wood pellets	Wood pellets	Recovered paper
3.	Other agglomerates	Wrapping papers	Recovered paper	Printing and writing papers
4.	Wrapping papers	Case materials	Newsprint	Cartonboard

5.	Chemical wood pulp	Other agglomerates	Case materials	Printing and writing papers, coated

5.1.8 Wood and paper industry

Wood and paper industry plays a significant role within the economy of all considered countries. The highest number of registered companies from the wood and paper industry has been identified for Slovenia (3 413), while the lower one for Bosnia and Herzegovina (2 027). In all considered countries the wood and paper industry employs similar percentages of labor force (between 2% and 3%). In every country, the highest share of companies from the wood and paper industry are classified under national C16 nomenclature - Manufacturers of wood and of products of wood and cork, except furniture, and the least amount of companies belong to C17 - Manufacturers of paper and paper products. The share of small companies that employ 9 people or less is significantly high in all countries for which this information was obtained. Wood and paper industry's contribution to GDP ranges between 1% and 2% in all considered countries. In Bosnia and Herzegovina, exports of products from the wood and paper industry cover a significant share (17%) of the total national export value. The lowest share has been identified for Slovenia (4%). More detailed quantitative comparison between the four countries is presented in Table 9 using the latest available data.

Some of the major problems that the wood industry faces in all considered countries include the fact that the business activities of many companies are mainly based on the export of raw materials instead of focusing on the production of products with higher added value, lack of skilled labor and experts due to brain drain and economically motivated migration of workers, lack of innovative technologies, fragmentation and insufficient networking of producers within the wood industry, and disconnection from education and academia (Diaspora invest, 2019; I.Š., 2018; UNOPS, 2016).

Recommendations for sector improvement include improving the relations between public forest management companies and wood processing companies, significant investments in education and research and development, definition of new markets as well as improving the brand image of producers (I. Š., 2020). Additionally, all actors involved within the value and supply chain should strive to improve networking and cooperation in order to improve national production of products with added value (UNOPS, 2016).

Table 9 Wood and paper industries of considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Number of registered companies from wood and paper industry	2 027 (in 2016) [a]	2 884 (in 2017) [d]	2 483 (in 2018) [g]	3 413 (in 2018) [h]
Employed workers in wood and paper industry	13 434 (in 2016) [a]	33 403 (in 2017) [d]	33 792 (in 2018) [g]	19 632 (in 2018) [h]
Share of workers in total working force	2,58% [a]	2,37% [d]	2,91% [g]	2,15% [h]
Classification of registered companies from wood and paper industry				
Manufacturers of wood and of products of wood and cork, except furniture	69,6% [a]	56,5% [d]	50,0% [g]	60,9% [h]
Manufacturers of paper and paper products	6,8% [a]	10% [d]	23,0% [g]	5,2% [h]
Manufacturers of furniture	23,6% [a]	33,5% [d]	27,0% [g]	33,9% [h]
Share of companies with 9 or less employees	Data not found	81,5% [d]	77,3% [g]	90,9% [h]
Wood and paper industry's contribution to GDP	2,10% (in 2018) [b]	1,09% (in 2017) [e]	1,4% (in 2018) [g]	1,4% (in 2018) [h]
Wood and paper industry's contribution to total export	17,19% (in 2019) [c]	8,67% (in 2017) [f]	5,7% (in 2018) [g]	4,03% (in 2018) [h]

5.1.9 Forest products trade

Italy is the main destination of exports of forest assortments from all four countries. The structure of top 5 export partner countries is interesting to analyze from the perspective of trade between the four countries. It may be noted that Bosnia and Herzegovina exports large values of their forest products to Croatia and Slovenia, Croatia exports significant value of their forest products to Slovenia, while Serbia exports significant value of their forest products to Bosnia and Herzegovina and Slovenia. This seems to confirm some interdependence between the forestry sectors, trade and markets of considered countries. The forest product trade of the four countries is mostly Europe oriented as countries export most of their forest products to other European countries. The largest contribution of the wood sector to export value in 2018 was achieved by Bosnia and Herzegovina (18%), while

the lowest one by Slovenia (7%). The wood sector contribution indicator includes the following categories: forestry and logging; manufacture of wood and of products of wood and cork, except furniture; manufacture of paper and paper products; and manufacture of furniture.

Other paper and paperboard category had the highest value in terms of import of forest products in 2018 in all the four countries. The rest of the categories vary, but it may be noted that all import forest products categories belong to the secondary processed forest products such as sawnwood, paper, wood pulp, carton boards, instead of primary forest products. This is not surprising as the considered countries are rich in forest resources and do not require significant imports of raw timber material. As it was the case with exports, the interdependency between the forest products market of Bosnia and Herzegovina, Croatia, Serbia and Slovenia can be seen through imports as well. Bosnia and Herzegovina imports significant values of forest products from Croatia and Slovenia, Croatia imports significant values of forest products from Bosnia and Herzegovina and Slovenia, Serbia imports significant values of forest products from Bosnia and Herzegovina, while Slovenia imports significant values of forest products from Croatia. Import of forest products considering top 5 partner countries in four countries is performed almost exclusively from other European countries.

The trade balance of forest products in 2018, was positive for Bosnia and Herzegovina, Croatia and Serbia, but negative for Slovenia.

Finally, the effects of current Covid-19 epidemic should be considered in relation to trade of wood and paper industry in considered countries. It is possible to compare figures for export of the first trimester in 2020 to export figures of the first trimester of 2019, however full effects of Covid-19 epidemic on wood and paper industry are yet to be understood. Considering the exports of wood and of products of wood and cork, there was a decrease in export in all considered countries. While the decrease was significant in Slovenia (-42%), it was much less noticeable in Serbia (-2%). Export of paper and paper products increased in Bosnia and Herzegovina and Croatia (around 10% in each country), while it decreased in Serbia and Slovenia (around -4% in each country). Exports of furniture increased in Croatia and Serbia, while it decreased in Bosnia and Herzegovina and Slovenia. Most notable increase occurred in Serbia (14%), while the most notable decrease occurred in Slovenia (-20%). Slovenia is

the only country that experienced a decrease of all the considered categories of export during the first trimester of 2020 as compared to the first trimester of 2019.

The decrease of exports can be interpreted as a direct consequence of trade partner countries entering a lockdown situation, where most of the foreign trade was temporarily forbidden due to the health and safety precautions. The most hard felt ban on foreign trade for all considered countries' wood sector companies was the one imposed by Italy that was lifted as of June 2020. However, the official data on foreign trade for the second trimester is still not available, therefore it is yet not possible to comment on potential recovery of wood and paper industries in considered countries. On the other hand, some countries registered an increase of exports for certain categories of wood and paper products. This could be justified by the fact that not all trade partner countries imposed a ban on foreign trade. Countries that managed to increase their exports of wood and paper products during the Covid-19 epidemic might have potentially took advantage of that trading possibility. More detailed quantitative comparison between four countries is presented in Table 10 using the latest available data.

Table 10 Forest products trade in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
***Top 5 categories of export by value, (FAO)* (in 2018) [a]**				
1.	Sawnwood (NC)	Sawnwood (NC)	Other paper and paperboard	Printing and writing papers
2.	Other paper and paperboard	Other paper and paperboard	Carton board	Other paper and paperboard
3.	Sawnwood (C)	Case materials	Sawnwood (NC)	Sawnwood (C)
4.	Wrapping papers	Sawnwood (C)	Industrial roundwood (NC)	Carton board
5.	Fuelwood (NC)	Veneer sheets	Case materials	Industrial roundwood (C)
***Top 5 countries of export, by value (FAO)* (in 2017) [c]**				
1.	Italy	Italy	Italy [g]	Italy
2.	Croatia	Egypt	Bosnia and Herzegovina [g]	Austria
3.	Germany	Slovenia	China [g]	China
4.	Slovenia	Austria	North Macedonia [g]	Algeria
5.	China	Hungary	Slovenia [g]	Germany

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Wood industry's contribution to total export	17,75% (in 2018) [e]	9,26% (in 2017) [b]	7,14% (in 2018) [d]	7,01% (in 2018) [f]
***Top 5 categories of import, by value (FAO)* (in 2018)** [a]				
1.	Other paper and paperboard	Other paper and paperboard	Other paper and paperboard	Other paper and paperboard
2.	Particle board	Printing and writing papers	Carton board	Chemical wood pulp
3.	Printing and writing papers	Sawnwood (C)	Printing and writing papers	Chemical wood pulp – bleached
4.	Sawnwood (NC	Case materials	Case materials	Sawnwood (C)
5.	Chemical wood pulp	Carton board	Chemical wood pulp	Wrapping papers
***Top 5 countries of import, by value (FAO)* (in 2017)** [c]				
1.	Croatia	Austria	Bosnia and Herzegovina [g]	Austria
2.	Italy	Germany	Romania [g]	Italy
3.	Germany	Italy	Austria [g]	Germany
4.	Slovenia	Slovenia	Russian Federation [g]	Croatia
5.	Sweden	Bosnia and Herzegovina	Hungary [g]	Slovakia
Forest products trade balance (FAO)	Positive (in 2018) [a]	Positive (in 2018) [a]	Positive (in 2018) [a]	Negative (in 2018) [a]
Effects of Covid-19 epidemic on exports of wood and paper industry (I. trimester 2020/ I. trimester 2019)				
Export of wood and of products of wood and cork, except furniture, export of articles of straw and plaiting materials	-8 628 975,06 EUR i.e. -9,91% [h]	-7 719 000 EUR i.e. -3,67% [i]	-2,1 million USD i.e. -1,68% [j]	-73 909 621 EUR i.e. -42,45% [k]
Export of paper and paper products	3021594,15 EUR i.e. 11,12% [h]	6 133 000 EUR i.e. 9,54% [i]	-11 million USD i.e. -4,55% [j]	-6 217 815 EUR i.e. -3,48% [k]
Export of furniture	- 6 896 175,86 EUR i.e. -5,21% [h]	1 420 000 EUR i.e. 2,56% [i]	39,3 million USD i.e. 14,13% [j]	-29 987 832 EUR i.e. -19,60% [k]

5.2 Overview of the current state of the art and recent developments of FSC certification in the targeted countries

In order to understand the current state of the art in the considered countries in terms of FSC certification as well as the roles that the four countries play in the regional forestry sector, it is possible to compare the number of FM certificates and the total amount of certified forest areas to the number of COC CHs of each considered country and their neighboring countries (Figure 3). From Figure 3 an inverse relation between the total amount

of certified forest areas and number of COC CHs in a given country may be noted. In other words, two types of countries might be identified in this region. On the one side there are countries with large certified forest areas but comparatively low number of COC CHs, i.e. Romania, Croatia, Bosnia and Herzegovina, and to a lower extent Serbia which may be seen as regional sources of certified timber. On the other side there are countries with very small certified forest areas but significantly higher number of COC CHs i.e. Italy and -to a much lower extent- Austria which may be seen as importers, processors and producers of certified timber products that add additional value. Indeed, most or all of the four countries export significant values of their forest products to Italy and Austria, which confirms the described distribution of forest certificates in presented wider region.

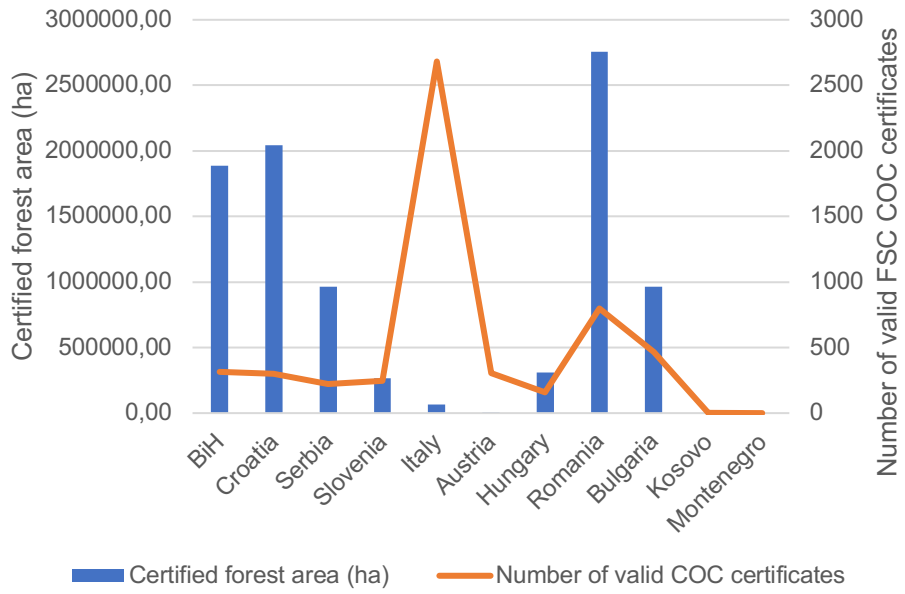


Figure 3 Cross-comparison of FSC FM and COC certification in wider region

Source: FSC (2020a)

5.2.1 Current state of art of FSC forest management certification in targeted countries

Bosnia and Herzegovina is the only country (among the considered countries) that has developed an FSC National Forest Stewardship Standard against which accredited certification bodies (CB) have to evaluate FM in the country. The FSC National Forest Stewardship Standard of Bosnia and Herzegovina was approved in 2019 and became valid on the 22nd of March 2020. For Croatia, Serbia and Slovenia, CBs have developed *interim* standards against which FM is evaluated.

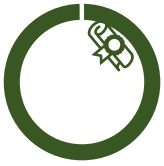
There are 9 valid FSC FM certificates in Bosnia and Herzegovina, while there are only 2 in Slovenia. In Bosnia and Herzegovina and Serbia all FM certificates are single certificates, which implies singular forest ownership. In Croatia and Slovenia there are also group certificates which mostly cover private and church forests. As of March 2020, Croatia holds the largest total FSC certified forest area (2 million ha), while Slovenia holds the smallest one (0,26 million ha). Consequently 74% of the total forest area in Croatia, and only 22% of the total forest area in Slovenia, is FSC certified. Considering the last 5 years, FSC FM certification is expanding in Bosnia and Herzegovina, slightly decreasing in Serbia due to restitution process, and is stable in Croatia and Slovenia. State-owned forests show a high level of FSC certification in all four countries: 100% of state-owned forests in Serbia, more than 96% of state-owned forests in Croatia and Slovenia and 83% of state-owned forests in Bosnia and Herzegovina are FSC certified. On the other hand, there no FSC certified private forests in Bosnia and Herzegovina and Serbia, while in Croatia and Slovenia only around 3% of private forests are FSC certified. A more detailed quantitative comparison between four countries is presented in Table 11 using the latest available data.

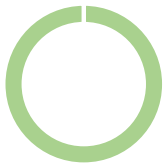
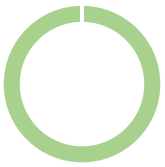
Comparing the total amount of FSC certified forest area in hectares for the four countries and for neighboring ones, it can be observed that as of June 2020 Romania (2,7 million ha) is the only country with a larger certified forest area compared to any of the considered countries in this research. Bulgaria (0,97 million ha) is comparable to Serbia, Hungary (0,3 million ha) is somewhat comparable to Slovenia, while Italy (66 525 ha), Austria (586,81 ha), Kosovo (0 ha), and Montenegro (0 ha) have significantly less or no FSC certified forests (FSC, 2020a).

A team of researchers from all the four countries succeeded in identifying specific areas where FSC has proven to contribute to the sustainable FM of Bosnia and Herzegovina, Croatia, Serbia, and Slovenia beyond national requirements. By analyzing non-conformities found in audit Public Summary Reports, realized between 2014 and 2018, Pezdevšek Malovrh *et al.* (2019) stated that FSC's contribution to sustainable FM may predominantly be seen in aspects such as: worker's rights, health and safety of employees, appropriate personal protective equipment, consultation with local people and interest groups, awareness of environmental impacts of forestry operations, waste disposal and storage of fuel, and maintenance of high conservation value forests.

Table 11 FSC FM certification in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
FSC national standard	FSC-STD-BiH-01-2019 [c]	No	No	No
Number of valid FSC FM certificates	9 [a]	3 [a]	3 [a]	2 [a]
Type of certificates [a]				
Single	9	2	3	1
Group	0	1	0	1
SLIMF	0	0	0	0
Number of FSC FM certificates covering state-owned forests	9 [a]	1 [a]	3 [a]	1 [a]
Number of FSC FM certificates covering private forests	0 [a]	2 [a]	0 [a]	1 [a]
Year of issue of 1st FSC FM certificate	2006 [a]	2000 [a]	2008 [a]	2007 [a]
Forest area under FSC FM certificates	1 888 822,71 ha [a]	2 044 675,12 ha [a]	963 490,84 ha [a]	266 279,48 ha [a]
Share of FSC certified forests in total forest area (national data)	 58,45%	 74,11%	 36,58%	 22,31%
State-owned forest area under FSC FM certificates	1 888 822,71 ha [a]	2 020 286,48 ha [a]	963 490,84 ha [a]	236 400 ha [a]
Share of state-owned FSC certified forests in total state-owned forest area	 83,50%	 96,33%	 100%	 96,70%
Primary activity in state-owned FSC certified forests	Logging [a]	Logging [a]	Logging and primary processing [a]	Logging [a]
Private and municipality-owned forest area under FSC FM certificates	0 ha [a]	24 388,64 ha [a]	0 ha [a]	29 879,48 ha [a]

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Share of private FSC certified forests in total private forest area	 0%	 3,7%	 0%	 3,32%
Primary activity in private FSC certified forests	n/a	Logging and gathering of non-wood products [a]	n/a	Logging [a]
Annual growth rate of certified forest area (mid 2015-mid 2020)	4,45% [a]	0,05% [a]	-0,80% [a]	0,03% [a]

5.2.2 Current state of art of FSC chain of custody certification in targeted countries

Although the first FSC COC certificate in Bosnia and Herzegovina was issued only in 2007, significantly later as compared to Croatia and Slovenia, as of March 2020 Bosnia and Herzegovina holds the highest number of valid FSC COC certificates (316) compared to Croatia, Serbia and Slovenia. In all four countries, most FSC COC CHs are small to medium sized private companies. Considering the registered primary activity they perform, FSC COC CHs:

- the highest share of primary processors is found in Croatia (33%) while the lowest one is found in Slovenia (11%);
- the highest share of secondary processors is found in Serbia (32%), while the lowest one is found in Croatia (9%);
- the highest share of brokers and traders is found in Bosnia and Herzegovina (59%), while the lowest one is found in Serbia (31%).

Considering the last five years, the strongest growth of FSC COC certificates has been observed in Serbia, where the number of certificates grew by 100 during that period i.e. by an annual rate of 13%, while the growth of certificates was the slowest in Bosnia and Herzegovina and Croatia with about 50 new certificates in each country. A more detailed quantitative comparison between the four countries is presented in Table 12 using the latest available data.

Although the share of FSC certified timber in Bosnia and Herzegovina, Croatia and Serbia within the total nationally available amount of timber that is annually produced is significant, the number of companies that hold a FSC COC certificate in all considered countries is relatively low. Comparing the absolute number of valid FSC COC certificates for considered countries to neighboring countries, as of June 2020 Italy (2682), Romania (800), and Bulgaria (464) hold a higher number of certificates, Austria (307) is comparable to the situation in Bosnia and Herzegovina and Croatia, while Hungary (158), Kosovo (1), and Montenegro (0) hold significantly less or no certificates (FSC, 2020a).

Table 12 FSC COC certification in considered countries

Source: References – References from tables

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Number of valid FSC COC certificates	316 [a]	300 [a]	222 [a]	247 [a]
Share of COC CHs in total number of registered companies in wood and paper industry	 15,59%	 10,40%	 8,94%	 7,24%
Year of issue of 1st FSC COC certificate	2007 [a]	2000 [a]	2008 [a]	2001 [a]
Primary activity of FSC CHs: [a]				
Primary processing	32,40%	44,00%	29,00%	19,50%
Secondary processing	41,00%	16,70%	35,20%	29,60%
Brokers and traders	26,60%	39,30%	35,80%	50,90%
Production focus: [a]				
Paper	4,69%	7,98%	27,12%	21,10%
Wood	95,31%	91,93%	72,83%	78,90%
Non-timber forest product	0%	0,09%	0%	0%
Annual growth rate of valid FSC COC certificates (mid 2015-mid 2020)	3,43% [a]	3,80% [a]	12,72% [a]	5,39% [a]

5.2.3 Current state of art of FSC trademark license holders in targeted countries

As of March 2020, there is only one FSC TM license holder in Slovenia and no one in the other three investigated countries.

This data might be interpreted in a few possible ways. It could signify that most companies who sell FSC certified products in considered countries are already FSC COC CHs and therefore do not need an additional license to use the FSC logo. It might also indicate that FSC brand awareness amongst consumers in all the four countries is still in developing stage and that companies which sell FSC products but are not COC CH do not find it useful to use this communication tool.

5.3 Barriers and growth opportunities for FSC certification in the targeted countries

5.3.1 Expansion of FSC forest management certification in targeted countries

While significant shares of state-owned forests in all considered countries are already FSC certified, little to no private forests enjoy the same status. The current state of the art of FM certification is supported by the fact that while states are actively managing their forests, PFOs face numerous barriers which prevent them from performing active and sustainable FM. In order to achieve growth of FM certification among private forests, various barriers have to be considered and resolved. Ensuring conditions for PFOs to perform active FM can enable further FM certification growth.

Two different models were described and presented to forest experts as a part of the survey. Forest experts were asked to score the models based on two criteria: applicability and efficiency. Both models were created with the expansion of private forest management and forest certification in mind. Model 1 presented a scenario of private forests concession where a voluntary contract for the duration of 5 years would be signed between a forest owner and a public forest management company which would assume charge of all forestry operations. Model 2 described a different solution, where private forest owners join their small forest properties under one larger forest management unit, without changing the ownership status of particular forests, thus not directly involving public forest management companies. More detailed description of both models can be found in Annex 1. In all considered countries, Model 2 was far better received by most forest experts as compared to Model 1.

The following sub-chapters present the complete results of semi-structured interviews conducted with forest experts representing academia, public FM company and PFOAs or Federation PFOAs where one is active. Only in Serbia it was not possible to get in contact with any of the PFOAs due to the lack of viable contacts, and therefore only the surveys from academia and public FM company representatives are presented as results.

5.3.1.1 Expansion of FSC forest management certification in Bosnia and Herzegovina

Most or all forest experts, i.e. at least 2 out of 3, agreed that unclear ownership status, small (average) size of single forest properties, forest fragmentation, lack of financial resources for performing FM, unclear understanding of how to perform FM, illegal logging, lack of PFOAs, significant state control over private FM, and insufficient forest road infrastructure represent the most common problems/barriers that PFOs face towards active FM in Bosnia and Herzegovina. Out of the above stated problems/barriers, most or all forest experts consider small (average) size of single forest properties, unclear ownership status, significant state control, lack of PFOAs, and unclear understanding of how to perform FM to be the most pressing problems/barriers i.e. priority problems/barriers that should be improved in order to encourage more active FM.

There are only 2 active PFOAs in Bosnia and Herzegovina which gather an insignificantly low number of PFOs. Compared to Croatia, Serbia and Slovenia, there are significantly less PFOAs in Bosnia and Herzegovina. Strong state control over FM is another barrier which often results, by reaction, in PFOs engaging in illegal logging. Forestry decisions are made using a top-down approach where PFOs are often not included into the decision-making process and therefore have no capacity to influence it: as a result the normative and policy framework does not reflect their needs and peculiarities and they are subject to the same rules as significantly larger state-owned forests.

Forest experts largely agreed that lack of PFO's awareness of FSC certification in general, not performing active FM, not managing their forests for commercial forest production, and lack of financial resources represent the most common as well as most pressing problems/barriers that PFOs face towards FSC certification.

Most PFOs have not heard of FSC FM certification, nor do they understand how it can benefit them, due to the fact that even if they perform active FM, they usually source timber products for either their own needs, or for the needs of a local market which does not demand certification.

Experts agree that using the potential benefits of PFOAs as well as group certification represents a way to grow FSC certification amongst PFOs. However, there seem to exist deeper issues for PFOs in Bosnia and Herzegovina, such as organization and association of PFOs, resolving the ownership status, and achieving a higher degree of deregulation coming from the state forest administration. Finally, besides social and environmental benefits, there might not be significant financial benefits of forest certification for PFOs. This is due to the fact that national demand for wood products more than exceeds current supply, therefore the price premium of certified timber, which might be achieved on the EU market, might not be so pronounced on the national market due to nationally established pricing and, above all, lack of domestic demand for certified materials.

All forest experts agreed that state financial support to cover the costs of certification, state support to PFOAs, national campaign/s for raising sustainable private FM awareness, national campaign/s for raising FSC brand awareness, and development of online platform for networking of PFOs represent the most common options that can help the expansion of FSC private forests certification in Bosnia and Herzegovina. Out of the above stated options, all forest experts agree that state support to PFOAs and national campaign/s for raising sustainable private FM awareness are the most viable options that can help the growth of FSC private forests certification i.e. priority options that should be implemented in order to encourage expansion of FSC certification.
While the support of state institutions towards PFOAs creation and raising sustainable private FM awareness are important in order to support the growth of FSC private forests certification in Bosnia and Herzegovina, it will truly be useful only after most pressing problems/barriers that PFOs face towards active FM and FSC certification described above are dealt with.

Although all experts expressed their partial agreeance with Model 1 which presented the option of reverse forest concession, proposing different possible benefits of it, it was generally stated that this model might only work under the fulfilment of certain conditions that are currently not present. In terms of efficiency or how well the model could work in Bosnia and Herzegovina it received an average score of 4,7/10. Regarding the applicability of the model considering the current conditions and barriers in the Country, it however scored less, with only 3/10.

The positive aspects of Model 1 were recognized in the possibility of improving the conditions of private forests transforming them from low to high forests in the long term, or by promoting better management of uncontrolled, illegal private cut. The model of forest concession did not score high on effectiveness due the fact that there are specific conditions which should first be achieved. The proposed conditions for potential effectiveness of this model are long-term perspective of the model, stable political situation of the Country, clear ownership status of forest land, education of PFOs, and ensuring that PFOs receive financial or other kind of benefits from the proposed concession model. Model scored low on applicability due to the fact that public FM companies might not wish to take on low quality private forests which would not be profitable in the short or even medium-term. Another possible reason for a low score on applicability of the concession model is the fact that ex-Yugoslavian countries decided to abandon the socialist regime but might still carry some sensitive memories connected to the process which appears similar to state ownership and management characteristic for Yugoslavia. Finally, PFOs may not trust very much state authority and therefore do not wish to consider giving their forests to be managed by a public company.

Model 2 which presented the option of aggrupation of smaller private forests was better received by all experts. It scored on average of 5.7/10 for its effectiveness and 4.7/10 for model's applicability considering the current conditions and barriers in the Country.
Good average score for effectiveness of Model 2 is supported by the general understanding that one of the only ways to improve private forest sector and conditions in private forests in Bosnia and Herzegovina is by performing aggrupation of small forest areas. Lower score for model's applicability is due to the fact that forestry development in general, and therefore private forests development too, are currently not a priority for the Country which deals with a multitude of challenges, such as various existing relations between entitles and among different levels/roles within the entities, unemployment, brain drain, security matters, EU integrations, etc. To counter the possible unwillingness of the State to invest financially in the proposed model, other available international funds might be considered, as well as foreign investors.

5.3.1.2 Expansion of FSC forest management certification in Croatia

Most or all forest experts agreed that small (average) size of single forest properties, forest fragmentation, unclear forest ownership status, lack of motivation towards active FM, and

absence of a market for forest goods for PFOs represent the most common problems/barriers that PFOs face towards active FM in Croatia. Out of the above stated problems/barriers, all forest experts agreed that forest fragmentation represents the most pressing problem/barrier that PFOs face towards active FM in Croatia i.e. priority problem/barrier that should be improved in order to encourage more active FM, while also offering other reasons that were uniquely not offered by any other expert.
The small (average) size of single forest properties in Croatia makes any form of active FM difficult, therefore making forest certification not financially beneficial for PFOs. Additional reason offered as a justification of the current situation in the private forest sector regarding the low PFOs' motivation towards active FM is similar as in Bosnia and Herzegovina, where the countries inherited the forest legislation from ex-Yugoslavia which did not recognize PFOs category separately nor did it develop special programs for private forest development. Not much progress has been made until present day in terms of forest legislation.

Forest experts largely agreed that the high perceived costs of the certification process, low perceived return on investment, lack of PFOs' awareness of FSC certification in general, and the fact that PFOs do not manage their forests for commercial purposes represent the most common problems/barriers that PFOs face towards FSC certification in Croatia.
The small average forest size, which discourages PFOs towards active FM, seems to be an underlying cause of stated problems/barriers. Experts see as group certification or the development of a specific certification program that takes into consideration the situation of the private forest sector in Croatia as possible solutions to overcome these barriers.

Forest experts agreed that direct state financial support to cover the costs of certification, state support to PFOAs, national campaign/s for raising sustainable private FM awareness, and market study and marketing actions in the country by FSC represent the most common options which can help the growth of FSC private forests certification in Croatia. Additionally, out of the above state options, most forest experts agreed that state support to PFOAs represents the most viable option which can help the growth of FSC certification of private forests i.e. priority option that should be implemented in order to encourage expansion of FSC certification, while also offering other answers that were uniquely not offered by any other expert such as development of FSC FM national standard or national campaign/s for raising FSC brand awareness.

All experts agreed that Model 1, i.e. the reverse forest concession model, is not a good option for Croatia. It was rated with 3/10 for both its efficiency or how well the model could work in Croatia as well as for its applicability of the model considering the current conditions and barriers in the Country.
The justification of a low score is supported with similar arguments that were received from the forestry experts in Bosnia and Herzegovina. Most notably those include a relatively poorer state of private forests as compared to state-owned forests which would discourage state FM companies to take on additional forest under their management as it would not prove financially profitable in a short or mid-term, and the fact the public institutions do not enjoy high levels of public trust, and performing a process somewhat opposite of privatization would remind people of negative sides of socialist regime that they might have experienced in ex-Yugoslavia.

Similar to results from Bosnia and Herzegovina, Model 2 -i.e. aggrupation of smaller private forests - was better received by all forestry experts. It scored on average of 5.7/10 for its effectiveness and 6.3/10 for model's applicability considering the current conditions and barriers in the Country.
Experts agreed that any initiative that have an aggrupation of smaller forest properties as a common goal is a good initiative and has a standing chance of a success. Additionally, it was stated that the State should help any singular forest buyer who wishes to create larger FM units by purchasing smaller neighboring forests with a special credit line.

5.3.1.3 Expansion of FSC forest management certification in Serbia

All forest experts agreed that small (average) size of single forest properties, unclear ownership status (i.e. disputes, no ownership claim, no ownership transfer, owner deceased…), unclear understanding of how to perform FM, and lack of PFO's understanding of economic potential of their forest/s represent the most common problems/barriers that PFOs face towards active FM in Serbia. Out of the stated problems/barriers, all forest experts consider small (average) size of single forest properties and unclear understanding of how to perform FM to be the most pressing problems/barriers i.e. priority problems/barriers that should be improved in order to encourage more active FM.
Similar to the presented situation in Bosnia and Herzegovina as well as in Croatia, experts perceive small and fragmented private forests with ageing PFOs as a most relevant barrier

towards active FM in the future. Additionally, experts reported that there is a feeling of lack of trust that is potentially preventing PFOs to actively engage in a PFOA.

All forest experts agreed that either the high perceived costs of the certification process or the low perceived return on investment of certification, together with the lack of PFO's awareness of FSC in general, as well as specific certification options such as group certification or the SLIMF[2] (Small and Low Intensity Managed Forests) approach and their respective financial benefits represent the most common problems/barriers that PFOs face towards FSC certification in Serbia. Additionally, all forest experts agreed that lack of PFOs' awareness of the SLIMF approach to FSC certification and its benefits represent the most pressing problem/barrier that PFOs face towards FSC certification in Serbia.
Although forest experts agree that in Serbia many PFOs do not know about specific benefits -including financial ones- of group or SLIMF certification, they add that even with this knowledge, many PFOs still lack financial resources needed to address forest certification. The (on average) mature age of PFOs, together with the fact that their forests are mostly used for personal use, makes investment in forest certification not appealing. Further on, experts claim that to sell a smaller quantity of timber from a private wood, PFO from Serbia does not need a forest certificate. It is therefore to be assumed that forest certification in private Serbian forests might be appealing to a new type of PFOs that have a specific plan of commercial logging.

All forest experts agreed that direct state financial support to cover the costs of certification is the most common as well as most viable option which can help the growth of FSC private forests certification in Serbia i.e. priority option that should be implemented in order to encourage expansion of FSC certification.
While state financial support might help grow forest certification in private forests, experts agree that the focus should first be place on raising the PFOs' awareness of SFM. Additionally, experts suggested that green public procurement (GPP), which is active in

[2] "A forest management unit shall qualify as a 'SLIMF' if it is either a 'small' forest management unit or managed as a 'low intensity' forest management unit. Forest management units may be classed as SLIMF units when they are 100 ha or smaller in area, or up to 1000 ha in area when this is formally proposed by the FSC-accredited national initiative. Forest management units may be classed as SLIMF units when the rate of harvesting is less than 20% of the mean annual increment and either the annual harvest from the total production forest area is less than than 5000 cubic metres or the average annual harvest from the total production forest is less than 5000 cubic metres per year during the period of validity of the certificate." *Source: FSC Standard SLIMF Elgibility Criteria FSC-STD-01-003 (Version 1-0) EN.*

Croatia and Slovenia due to the EU legislation, should raise the demand for certified forest products that might also result in the growth of FSC certification in private forests.

Model 1 which presented the option of reverse forest concession received an average score of 5.5/10 in terms of its efficiency or how well the model could work in Serbia. However, in terms of model's applicability considering the current conditions and barriers in the Country, it scored significantly lower (2.5/10).
Although Model 1 received higher score in terms of its possible efficiency, PFOs are not likely to hand their forests to a public company. Experts further made a case of differences between urban PFOs, who do not have high motivation for active FM, and rural PFOs that more often engage in active FM. Based on this distinction, Model 1 might potentially be directed towards urban PFOs that might be less attached to their forest properties (or at least less interested in their management) and do not necessarily financially depend on their forests.

As in the case of Bosnia and Herzegovina and Croatia, Model 2 which presented the option of aggrupation of smaller private forests scored better compared to Model 1. In terms of its effectiveness it scored 6.5/10, while scoring a lower mark of 4/10 for its applicability considering the current conditions and barriers in the Country.
All experts agree that Model 2 has a chance of engaging PFOs into active FM with one important condition that is direct financial state support.

5.3.1.4 Expansion of FSC forest management certification in Slovenia

Most forest experts agreed that small (average) size of single forest properties, forest fragmentation, unclear understanding of how to perform FM, no technical knowledge and/or machinery for forest management, significant state control over private forest management, and the fact that PFOAs do not represent the interests of the owners sufficiently represent the most common problems/barriers that PFOs face towards active FM in Slovenia. Most forest experts agreed that small (average) size of single forest properties as well as forest fragmentation represent the most pressing problem/barrier that PFOs face towards active FM in Slovenia i.e. priority problems/barriers that should be improved in order to encourage more active FM, while also offering other reasons that were uniquely not offered by any other expert.

As for all other countries, the main problem experts perceive for the private forest sector in Slovenia is represented by the fact that private forests are small and further fragmented. Experts claim however, that currently neither PFOAs nor forestry policy in Slovenia are making significant efforts towards aggrupation of smaller private forests. Additionally, PFOs mature average age, high price of forestry work, as well as the fact that sometimes PFOs do not know the exact location of their forest further justify judgement of forest experts.

Most or all forest experts agreed that the high perceived costs of the certification process, the lack of available state/EU funds for forest certification in the country, the fact that PFOs do not manage their forests for commercial purposes, additional restrictions imposed by the FSC standards, as compared to national regulation, and the fact that some PFOs are not able to meet FSC FM standard requirements represent the most common problems/barriers that PFOs face towards FSC certification in Slovenia.
One potential problem derives from old equipment used by PFOs that might not be in compliance with FSC standards (in terms of, for example, health and safety, impacts, etc.). Experts also pointed to high domestic market penetration of competing forest certification scheme PEFC, which appears to conduct active certification advertisement and some experts believe that due to this reason, PFOs are better aware of PEFC forest certification scheme as compared to FSC scheme.

Most forest experts agreed that the development of a FSC regional/national office, direct state financial support to cover the costs of certification, indirect state support (i.e. fiscal regime, state funds for FM), state support to PFOAs, and a market study and marketing actions in the country by FSC represent the most common options which can help the growth of FSC private forests certification in Slovenia. Additionally, most or all forest experts agreed that development of FSC regional/national office, indirect state support as well as state support to PFOAs represent the most viable options which can help the growth of FSC private forests certification in Slovenia i.e. priority options that should be implemented in order to encourage expansion of FSC certification.
Experts agree that a combination of stronger involvement by state actors and stronger national presence of FSC would improve chances of FSC certification to growth in private forests of Slovenia. A National office should perform active FM certification promotion, provide necessary information to PFOs, as well as organizing educational workshops.

According to experts the role of the state cannot be avoided: for example, forestry policies should be revised in order to give higher importance to forest certification.

Similar to results from Serbia, Model 1 -i.e., reverse forest concession model - received an average score of 5.3/10 in terms of its efficiency or how well the model could work in Slovenia. However, in terms of model's applicability considering the current conditions and barriers in the Country, it scored significantly lower at 3.3/10.
Although scoring higher in terms of model's efficiency, a low score of model's applicability may be justified in a similar way as for Bosnia and Herzegovina and Croatia, i.e., the previous non-democratic political system of ex-Yugoslavia still has a consequence of a low public trust in public institutions, i.e. low trust of PFOs in the national public FM company. Additionally, current forest legislation states that the public FM company manages state-owned forests only, and some changes in legislation would be required too in order for this model to function.

Finally, just as the result from other considered countries showed, Model 2, which presented the option of aggrupation of smaller private forests, scored better with forest experts compared to model 1. The model scored 7.3/10 in terms of its effectiveness and 8.7/10 in terms of its applicability considering the current conditions and barriers in the Country.
Most experts stated that the only potential barrier to the functioning of this model is the willingness of state to participate financially. Strong financial supports of certification could tackle potentially lower motivation of PFOs to form aggrupations of private forests. State financial support would also be better in line with the new EU Green Deal. A short summary of the results from considered countries is available in Table 13.

Table 13 Summary of the results – FM certification growth in considered countries

Country	**Bosnia and Herzegovina**	**Croatia**	**Serbia**	**Slovenia**
Most pressing problems/barriers that PFOs face towards active FM	Small (average) size of single forest properties, unclear ownership status, significant state control, lack of PFOAs, unclear understanding of how to perform FM	Forest fragmentation	Small (average) size of single forest properties, unclear understanding of how to perform FM	Small (average) size of single forest properties, forest fragmentation
Most pressing problems/barriers that PFOs face towards FSC certification	Lack of PFO's awareness of FSC certification in general, not performing active	High perceived costs of certification process, PFOs are not managing their forests for	Lack of PFO's awareness of FSC in general as well as specific certification options such as	High perceived costs of certification process, PFOs are not managing their forests for

	FM, PFOs are not managing their forests for commercial forest production, lack of financial resources	commercial forest production	group or SLIMF certification and their respective financial benefits	commercial forest production
Most viable options which can help the growth of FSC private forests certification	State financial support to cover the costs of certification, state support to PFOAs, national campaign/s for raising sustainable private FM awareness, national campaign/s for raising FSC brand awareness, development of online platform for networking of PFOs	State support to PFOAs	Direct state financial support to cover the costs of certification	Development of FSC regional/national office, indirect state support (i.e. fiscal regime, state funds for FM), state support to PFOAs
Average score for effectiveness of model 1	4.7/10	3/10	5.5/10	5.3/10
Average score for applicability of model 1	3/10	3/10	2.5/10	3.3/10
Average score for effectiveness of model 2	5.7/10	5.7/10	6.5/10	7.3/10
Average score for applicability of model 2	4.7/10	6.3/10	4/10	8.7/10

5.3.2 Expansion of FSC chain of custody certification

According to the results presented in chapter 5.2 which consider the four targeted countries as well as their immediate neighboring countries, there is an inverse relation between the total amount of certified forest area and the number of COC CHs in a given country. While the described distribution of forest certificates in the wider region might be seen as a direct reflection of: more developed wood processing sector in Italy as compared to the corresponding sectors in the four considered countries, a broad gap between the primary sector (forests) and the industrial sector in four considered countries, or a significant Italian wood import, it might also be hypothesized that large exports of certified timber from the four countries into Italy are to a degree preventing (or slowing) further FM certification growth in Italy, and vice-versa that large Italian imports of certified timber from the four considered countries are de facto slowing the rate of COC development in Bosnia and Herzegovina, Croatia, Serbia and Slovenia.

Four out of six CBs that most dominantly offer their services within the targeted countries participated to the survey circulated among them within the framework of this research. All of them described their market approach as proactive and reported various method of

approaching new clients such as using their official website, using social media, email marketing, direct meetings, and word of mouth.

According to CBs' perspective, the most common current problem/barriers that non COC CHs from the considered countries experience towards COC certification are low FSC brand awareness and consequently low demand for certified products amongst national consumers, that does not justify the costs of certification including the annual fees, low environmental awareness amongst producers which includes lack of COC certification awareness, market saturation, and the fact that many companies are small with outdated equipment which may cause a source of non-compliance according to FSC COC standard. In order to address some of the most common current problem/barriers that non COC CHs from the considered countries experience, CBs recommend that a better promotion of the FSC forest certification scheme in all considered countries is necessary, in order to raise brand awareness amongst consumers, but also forest certification awareness amongst producers. Additionally, most CBs recommended a dedicated market study and marketing actions to be performed by FSC Italy considering the targeted countries.

CBs recognized that for current COC CHs the most common problems to meet the FSC COC standard requirements include: understanding how to properly source FSC certified materials according to the requirements of the standard; maintenance of prescribed internal procedures; training of their staff on mandatory internal procedures required by the standard; improper monitoring of materials during production and storage phases; and improper usage of the FSC trademarks.
In order to address some of the most common problems to meet the FSC COC standard requirements, as well as to help COC certification growth, CBs agree that translation of the main FSC COC standard into national languages would prove helpful for CHs in order to be able to better understand and implement it.

CB survey results have been further analyzed and discussed vis-à-vis a literature review that was performed with the aim of gaining a clearer country-specific perspective on expansion of FSC COC certification in the four targeted countries.

Finally, while the short-term effects of the Covid-19 epidemic on wood and paper industry of considered countries have already been registered, it is yet not possible to comment on

epidemic's effect on expansion of FSC COC certification due to lack of data which considers longer time frames. It is possible that issuing of new COC certificates by accredited CBs has been postponed during the first few months of 2020, due to nationally imposed prohibition to freely move within the Country and perform necessary audits.

5.3.2.1 Expansion of FSC chain of custody certification in Bosnia and Herzegovina

There were 2 027 registered companies in the wood and paper industry in Bosnia and Herzegovina in 2016. With 316 FSC COC CHs in June 2020, the remaining potential for expansion of COC certification is significant i.e. more than 84 % of registered companies.

Further improvement of the wood and paper industry by improving the relations between public FM as well as wood processing and paper companies or defining new markets as well as improving the brand image of producers from Bosnia and Herzegovina (I. Š., 2020) would potentially make a positive impact of expansion of FSC COC certification as well.

There are numerous associations in Bosnia and Herzegovina that gather companies from wood and industry, such as the Association of furniture producers (*Udruženje proizvođača namještaja*) that includes 12 major furniture producing companies, the Wood Industry and Forestry Association (*Asocijacija drvne industrije i šumarstva*) that gathers wood industry companies that are also part of the Chamber of commerce of Bosnia and Herzegovina, the Wood cluster of Herzegovina (*Drvni klaster Hercegovine*) with 33 members, the Wood cluster Prijedor (*Klaster Drvo Prijedor*) with around 40 members, the Wood cluster Furniture and Wood of BiH (*Drvni klaster namještaj i drvo BiH*), the Aggrupation of forestry and wood industry of FBiH (*Grupacija šumarstva i drvne industrije FBiH*), and potentially more.
Although it is encouraging to see how companies from the wood industry network and cooperate among them, it is evident that most of the associations are entity or region based. Networking and aggrupation of companies from the wood industry into various forms of associations can be seen as a good indicator of wood sector development and as such it can be considered as a positive potential driver for expansion of FSC COC certification in Bosnia and Herzegovina, including for COC group certification.

As a potential candidate to the EU membership, Bosnia and Herzegovina's national policies are influenced by current EU legislation. Although there is no mandatory GPP in BiH's legislation, there is an active initiative to change the Public procurement Law in a way that

GPP would be listed as a voluntary mechanism, effectively bringing Bosnia and Herzegovina's legislation on public procurement closer to EU's (S. M., 2020).
Even without mandatory GPP, Bosnia and Herzegovina count the highest number of COC CHs among the considered countries. It may be assumed that making GPP a voluntary or even mandatory mechanism can only drive further expansion of FSC COC CHs.

5.3.2.2 Expansion of FSC chain of custody certification in Croatia

There were 2 884 registered companies in the wood and paper industry of Croatia in 2017. As of June 2020, there are 300 FSC COC CHs in Croatia, with a significant remaining potential for expansion of certification i.e., 90% of registered companies. The wood and paper industry in Croatia is quite fragmented, with 81% of companies employing 9 or less people. This might negatively affect the expansion of COC certification as the small companies potentially see certification as too expensive, as reported also by CBs.

While the most common problems of the wood industry in Croatia do not significantly differ from those identified for Bosnia and Herzegovina, in recent years, the Croatian government has undertaken various steps to improve the domestic wood industry (Kropivšek *et al.,* 2019). For the first time since Croatia joined the EU, a Development strategy for wood processing and furniture production (2017-2020) has been developed and it includes the guiding principle of national production of products with higher added value. Other goals of the Strategy include creation of a single database of wood industry, as well as removal of restrictions such as low capitalization and illiquidity and weak withdrawal of funds from available sources and co-financing programs (Zrinušić, 2018). This may be seen as a positive driver for the expansion of COC certification as the Croatian government recognized the wood industry as one of its strategic priorities.

There are different associations operating within the forestry sector and wood industry in Croatia, such as the Croatian wood cluster (*Hrvatski drvni klaster*) that has 70 individual members and 5 members-associations, or the Wood Processing Industry Association (*Udruženje drvno-prerađivačke industrije*) with 67 members coming from the wood industry that are also part of the Croatian Chamber of Commerce, as well as specialized and up-to-date online news portals dealing with the wood sector.
This may be seen as an indicator of some good networking and cooperation capacity with potential positive direct and indirect effects on the expansion of the FSC COC certification

as these associations often organize national and regional meetings, fairs, workshops as well as publish valuable information and statistics.

As an EU member, Croatia has instated measures related to mandatory GPP. Specifically, there are dedicated public guidelines that explicitly suggest FSC certification as a valid tool for the public procurement of paper or office furniture.
Due to the fact that State acts as a major purchaser in Croatia, GPP may be seen as a positive driver for the growth of FSC COC certification, especially in the paper production sector, as most of current COC CHs focus their production on wood materials.

5.3.2.3 Expansion of FSC chain of custody certification in Serbia

There were 2 483 registered companies in the wood and paper industry in Serbia in 2018. With 222 FSC COC CHs as of June 2020, there is a significant potential for the growth of FSC COC certification in the country, equivalent to more than 91% of registered companies. Most wood and paper companies in Serbia (77%) employ 9 workers or less, which suggests that the industry is fragmented and mainly made-up of medium-small companies. Just like in Croatia, the fact that small companies might perceive certification costs as too high can negatively affect expansion of FSC COC certification also in Serbia.

Further developing the wood and paper industry in Serbia by joint efforts of all actors involved within the value chain, in order to improve networking and cooperation, more active State role in creation of an umbrella regulation for the wood sector in Serbia which would include forestry, the wood processing industry, and the pulp and paper industry, and by supporting the demand for education in the wood sector, which is on decline, by recognizing wood industry as an industry of national importance (UNOPS, 2016) will potentially make positive effects on expansion on FSC COC certification.

There seems to be a lack of wood clusters in Serbia as only one active cluster was identified, named Timber cluster (*Klaster drvo*). There used to be a cluster named Agency for wood (*Agencija za drvo*) with over 100 members, however, based on publicly available information, it is not clear if this is still operating.
The apparent lack of wood clusters seems to confirm the previously mentioned problem of fragmentation and insufficient networking of producers within the wood industry recognized

by UNOPS (2016). This can have a negative effect on the development of the FSC COC certification within the country.

Similar to the situation in Bosnia and Herzegovina, Serbia currently does not have a valid GPP legislation in place. According to Alhem (2019), in 2018 public procurement contributed with some 8% to the Serbian GDP, having substantial effects for local economy.
Although the development of a GPP strategy in Serbia is only at the initial stages, it will eventually bring Serbia's legislation closer the EU one, and potentially act as a positive driver for expansion of FSC COC certification.

5.3.2.4 Expansion of FSC chain of custody certification in Slovenia

There were 3 413 registered companies in the wood and paper industry in Slovenia in 2018. With 247 FSC COC CHs as of June 2020, there is a significant potential for expansion of FSC COC certification (i.e. about 93% of registered companies). As in Croatia and Serbia, the wood and paper industry in Slovenia is quite fragmented due to the large presence of small companies that employ 9 workers of less and make about 91% of all registered companies within these sectors. As already commented for the other three countries, this can be seen as a potential barrier to the expansion of FSC COC certification.

While the Slovenian wood sector shares some of the main problems reported for the other considered countries, Kropivšek *et al.* (2019) reported that in recent years it has been significantly improved. This includes new investments, improvement of all financial indicators, growth of exports, and realization of many political and macroeconomic measures to help this sector (Kropivšek *et al.*, 2019): all these could potential have a positive indirect effect on the development of FSC COC certification.

There are many associations that gather companies from the wood industry in Slovenia, such as the Wood industry cluster (*Lesarski grozd*), the Woodworkers' association of Slovenia (*Društvo lesarjev Slovenije*), the Wood and furniture industry association (*Združenje lesne in pohištvene industrije*), the Development center of creative furniture industry (*Razvojni center kreativne pohištvene industrije*), the Competence center for human resources development in woodworking (*Kompetenčni center za razvoj kadrov v lesarstvu*), and potentially more.

As in Bosnia and Herzegovina and Croatia, this can have a positive effect on the future development of the FSC COC certification in Slovenia, as it indicates some networking attitude of the wood and paper industry.

Like Croatia, Slovenia is an EU-member country which has instated measures related to mandatory GPP. Specifically, there are dedicated public guidelines that that explicitly suggest FSC certification as a valid tool for the public procurement of paper or office furniture. GPP may be seen as a potential positive driver for the expansion of FSC COC certification due to the fact that State normally acts as a major purchaser.

6 CONCLUSION

Bosnia and Herzegovina, Croatia, Serbia and Slovenia are four neighboring forest rich countries. Put together, their forests cover an area of more than 8,8 million ha, i.e. about the size of Serbia. Of this, as of June 2020, roughly 5,2 million ha, i.e. about the size of Bosnia and Herzegovina, are FSC certified, which corresponds to about 2,5% of the total FSC certified forest area in the world.

About 92% of the state-owned forests within targeted countries are already FSC certified, therefore the expansion of FSC FM certification, if any, will mostly be possible for private forests which currently correspond to less than 1,5% of the total FSC certified area. Last 5 years have shown a very modest expansion of FSC FM certification in targeted countries and, in particular, their private forests. Results of a survey with forest experts from considered countries show that currently there are significant barriers and problems that private forest owners face towards active FM and, as a consequence, towards certification too. Those include forest fragmentation, resulting in limited size of forest areas per single PFO, coupled with unclear or unresolved ownership status, limited understanding and capacity of how to perform FM, and significant state control i.e. regulation as a burden for many owners. The most significant problems and barriers that PFOs face towards FSC forest certification are the lack of awareness of FSC certification in general (in particular in Bosnia and Herzegovina and Serbia), and high perceived costs of certification. In the case of Croatia and Slovenia, another relevant aspect is the fact that PFOs very often do not manage their forests for production purposes. Direct or indirect state support, campaigns to raise awareness of FSC certification scheme and the development of a regional or national FSC offices are some of the most agreed solutions that - according to the interviewed experts - might help the expansion of FSC certification into private forests.

Forest experts from all considered countries agreed that, due to the low level of public trust into public companies and institutions, the idea of developing private forests aggrupations i.e. larger forest management units without ownership transfer could be a more viable and appropriate solution compared to forest concessions. The main barrier to implement this model seems to be a lack of driving force such as State, that needs to adapt forestry regulation for innovative forest management and provide initial financial help. During the process of adaptation of forestry regulation, it might be useful to consider a ‘smart regulation’ concept which puts together self-regulation and co-regulation, while non-governmental

organizations (such as FSC) act as regulatory surrogates. An interesting example of private forest aggrupation that conceptually stands somewhere between the two suggested models of this thesis and could potentially be replicated in targeted countries is the Waldplus initiative in Northern Italy (Trentino Alto-Adige, Veneto and Lombardy). The South Tyrol-based company Waldplus offers to PFOs a complete service for the sustainable forest management of their forests. PFOs sign a 10-yearelong contract and agree their forest to be temporary managed by WaldPlus, without losing their ownership rights. The services offered by Waldplus include FMP, participation to FSC FM group certification, and trade and marketing of forest products retrieved from the forests. In 2019 forests managed by Waldplus were the first in the world to have their impacts verified for all five ecosystems services under the Ecosystem Services Procedure launched by FSC in 2018. This gives PFOs further opportunities in terms of visibility, income differentiation and motivations towards active and responsible FM of their forests. This business model therefore is presented to PFOs as an ideal package if they do not have time, health or interest to perform active FM themselves.
Alternatively, some forest experts believe that a public call for the purchase of private forest land at real prices might also prove successful as a way to create larger forest management units and therefore increase active FM and forest certification, as there are both potential buyers and sellers of private forests in all considered countries.

As both FSC FM and COC standards require compliance with the applicable national and international laws and conventions (i.e. EU Timber Regulation which is legally binding for Croatia and Slovenia, but also important for Bosnia and Herzegovina and Serbia as EU membership candidates), further research needs might include the potential positive effects of FSC certification scheme on suppression of levels of illegal logging in private forests in considered countries, or willingness of State to finance group certification of private forests as a driver for active FM, expansion of forest certification, and suppression of illegal cut.

While the number of registered companies operating in the wood and paper industry varies in each considered country, across all countries this industry employs 2-3% of labor force and contributes to 1-2% of the national GDP. Due to the fact that, as of June 2020, only between 7-15% of registered companies hold an FSC COC certificate, there is still a great potential for FSC COC certification expansion in all targeted countries. During the last 5 years only the Serbian wood sector has shown significant FSC COC expansion while the

rest of the considered countries' sectors experienced a very modest growth. This might be explained by the fact that most of the companies from the wood and paper industry are small companies which employ 9 workers of less and might perceive certification costs as too high and therefore deicide not to become certified. Results from the survey with accredited CBs show that the most significant problems and barriers that companies which consider becoming FSC certified face are low FSC brand awareness amongst national consumers and low demand for certified products from national consumers that does not justify the costs of certification, low environmental awareness amongst producers which includes lack of COC certification awareness, and the fact that many companies are small with outdated equipment which may cause a source of non-compliance according to FSC COC standards. In order to encourage the expansion of FSC COC certification in considered countries, certification bodies agree that a better promotion of the FSC certification scheme in all considered countries is necessary, therefore raising brand awareness amongst consumers, but also forest certification awareness amongst producers. Additionally, and related to this suggestion, most CBs recommended a dedicated market study and specific marketing actions to be performed by (or with the support of) FSC Italy and considering the targeted countries.

Further research needs might include exploring drivers behind FSC COC certification expansion in Serbia and understanding if they could be modified and applied to the conditions of other considered countries in order to encourage similar positive expansion results.

The potential expansion of FSC certification in the four considered countries should be discussed while keeping the effects of Covid-19 epidemic in mind. Although it is still too early to comment on epidemic's effects on consumer choices and wood sector development, it is evident that foreign trade of certain wood products categories decreased during the first trimester of 2020. Prolongment of such a scenario will likely lead to further job losses and likely closing of small companies. Financial crisis that started in 2008 was perceived as a double-edged sword. While FSC certification expanded, because many companies were trying to differentiate themselves on the market, numerous companies from the wood sector in targeted countries had to close shop due to financial struggles. Further research needs might include evaluation Covid-19 epidemic's effects on forest production trends, industrial strategies and responsible consumer behavior in four considered countries, or epidemic's effects on direction of wood industry development in targeted area.

In conclusion, while a significant amount of forest area is already certified across the four countries, further expansion of FSC forest certification into private forests as well as further expansion of FSC COC certification can bring additional environmental, social and economic benefits for private forests, PFOs, wood and paper industry, and entire countries. To achieve this scenario, public bodies will have to continue their efforts to demine remaining mined forest area, adapt their forestry regulations and governance to give equal importance to both public and private forests and create room and good conditions for private owners to actively and responsibly manage their forests, and support the development of the wood processing sector in technical as well as R&D terms. The private sector will have to strive to create nation and region-based networks that will enable production of value-added forest products and perhaps take some inspiration from other countries where specialized forest management companies have emerged as a driver for active forest management and forest certification. Academia and certification bodies within the boundaries of their crucial roles have to continue their active support of market development. Finally, FSC International, by means of FSC Italy as a contact point, may support the expansion of certification by providing relevant technical documents and standards in local languages to enable better understanding and implementation on the ground as well as actively participate in promotion of certification in order to raise consumers' and companies' environmental and FSC brand awareness. This should also help creating favorable conditions to encourage the creation of a FSC regional or several FSC national offices that could then have the responsibility to support the developments of forest certification in the area.

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7 ANNEXES

Annex 1 – Questionnaire regarding FSC FM growth opportunities

Thank you for participating in this research developed as a Master thesis at Padova University (Italy), within the framework of the International Erasmus Mundus Master Program in Mediterranean Forestry and Natural Resources Management (MEDfOR). The study is aimed to better understand the current barriers and opportunities for the
growth of Forest Management certification according to the Forest Stewardship Council (FSC) standards in Adria- Balkan region (Bosnia and Herzegovina, Croatia, Serbia, and Slovenia), with a special focus on private forest owners.

It includes two main sessions:
1) the first one focuses on problems/barriers and opportunities associated with forest management and certification for private forest owners in your country
2) the second one presents possible solutions to be discussed and allows collecting of additional proposals and ideas

You have been invited based on your experience on this topic. While addressing questions, please keep in mind the specific national context of your country. Data collected through this survey will be treated confidentially and anonymously only for purposes of the research, in compliance with the General Data Protection Regulation (GDPR), Regulation (EU) 2016/679. By filling the questionnaire, you give me the permission to process data you provide for the purposes of the research project. Expected time to complete the questionnaire is estimated under 20 minutes. It will be my pleasure to include you in the Acknowledgement chapter within my thesis. Upon the completion, I would also be glad to share a copy of the thesis with you.

Session 1

1) Please check all the boxes representing the problems/barriers that private forest owners face towards active forest management, applicable in your country. If you feel
that one or more barriers are not listed, please feel free to use option "Other" to add them. Add as many as you think are necessary.

☐ Small forest area
☐ More disconnected forests under single ownership (i.e. fragmentation)
☐ Unclear ownership status (i.e. disputes, no ownership claim, no ownership transfer, owner deceased…)
☐ Unclear idea regarding the location of owned forest
☐ Lack of motivation towards active forest management
☐ Unclear understanding of how to perform forest management

☐ No technical knowledge and/or machinery for forest management
☐ Lack of financial resources for performing forest management
☐ High perceived costs of forest management
☐ Lack of understanding of economic potential of their forest/s
☐ Low timber prices
☐ Significant state control over private forest management (e.g., restrictions, regulations…)
☐ Lack of private forest owners' associations
☐ Private forest owners' associations do not represent the interests of the owners sufficiently
☐ Insufficient forest road infrastructure
☐ Absence of a market for forest goods for private forest owners
☐ Illegal logging
☐ Other:

2) Out of the stated problems/barriers in question 1, which are, in your opinion, the 5 most significant problems/barriers affecting private forest owners in your country? Please rank them from the most relevant one (1) to the less relevant one (5). If you have identified less than 5, please rank those you have identified. Please justify the choice of 5 most significant problems/barriers affecting private forest owners in your country.

1.	
2.	
3.	
4.	
5.	

3) Please check all the boxes representing the problems/barriers that private forest owners face towards FSC certification, applicable in your country. If you feel that one or more barriers are not listed, please feel free to use option "Other" to add them. Add as many as you think are necessary.
☐ High perceived costs of certification process
☐ Low perceived return on investment (i.e. certification)
☐ Lack of financial resources
☐ Lack of available state/EU funds for forest certification in the country
☐ Lack of awareness of FSC certification in general
☐ Lack of awareness of group certification and its financial benefits
☐ Lack of awareness of Small and low intensity managed forests - SLIMF certification and its financial benefits
☐ FSC certification perceived as not useful in their business model
☐ Not actively managing their forest/s
☐ Not managing their forests for commercial forest production
☐ Not able to meet FSC FM standard requirements

☐ Lack of a FSC official national FM standard
☐ Too many potential non-conformities
☐ Additional regulation imposed by FSC standard, as compared to national regulation
☐ Other:

4) Out of the stated problems/barriers in question 3, which are, in your opinion, the 5 most significant problems/barriers affecting private forest owners in your country towards FSC certification? Please rank them from the most relevant one (1) to the less
relevant one (5). If you have identified less than 5, please rank those you have identified. Please justify the choice of top 5 most significant problems/barriers affecting private forest owners in your country towards FSC certification.

1.	
2.	
3.	
4.	
5.	

5) What are, in your opinion, the main opportunities associated to FSC certification for private forest owners?

6) Please check all the boxes representing the options which can help the growth of FSC private forests certification in your country. If you feel that one or more barriers are not listed, please feel free to use option "Other" to add them. Add as many as you think are necessary.
☐ Development of FSC FM national standard
☐ Development of FSC regional/national once
☐ Direct state financial support to cover the costs of certification
☐ Indirect state support (i.e. fiscal regime, state funds for forest management)
☐ State support to private forest owners' associations
☐ National campaign/s for raising FSC brand awareness
☐ National campaign/s for raising sustainable private forest management awareness
☐ Development of online platform for networking of private forest owners
☐ Development of FSC promotional material in local language
☐ Market study and marketing actions in the country by FSC
☐ Other:

7) Out of the stated options in question 6, which are, in your opinion, the 5 most significant options that can help FSC private forest certification growth? Please rank them from the most relevant one (1) to the less relevant one (5). If you have identified

less than 5, please rank those you have identified. Please justify the choice of 5 most significant options that can help FSC private forest certification growth.

1.	
2.	
3.	
4.	
5.	

Session 2

Please consider the following 2 models that propose solutions towards engaging private forest owners into active forest management of their forest properties, and comment on the practicality and applicability of such models within the conditions of your country. Do you think these models can be effective? How would you improve them?

Model 1 – Concession of private forests

Reasoning behind the model:
State owns and manages significant forest areas in Bosnia and Herzegovina, Croatia, and Serbia. Compared to rather inactive private forest owners, state forest enterprises have significant knowledge, experience, and potentially resources (technical and human ones) to take larger forest areas under their management. Expansion of FSC certified area and FSC certified forest inputs should organically follow, as forest certification appears to be the modus operandi for public forest management companies. This model promotes FSC FM group certification. In this model the state's role is major.

How does it work?
A voluntary contract is drafted for the duration of 5 years between a private forest owner and the state/cantonal forest management company. The state/cantonal forest management company assumes complete technical support (i.e. planning, management/harvesting operations, certification, sales…), leaving the private forest owner without any responsibility over forest management. Profits from the sales are shared in an agreed manner, covering the costs procured by the state/cantonal forest management company. Alternatively, instead of financial payments, private forests owners obtain the right for annual agreed quantity of fuel wood. It might also be useful if during the first few years of the project, the state promotes the initiative among private forest owners to support the up-taking.

Advantages:
• Unmanaged forest areas become sustainably managed with forest multifunctionality in mind (good for the national interests as well as private - unmanaged forests are not highly profitable and may be more prone to disturbances like fire, pests, etc.)

• Many barriers that are usually present for private forest owners to conduct active forest management are automatically removed
• Rate of illegal cut is decreased
• State forest management companies already have good networks, knowledge and abilities to take additional management
• Mitigation against climate change by improving forest conditions, afforesting with appropriate species
• Private forests are often coppiced forests, they can be a great source of fuel wood, used for bioenergy, in line with EU's goals of being carbon neutral by 2050
• Concession model could inspire private sector to offer the same service, potentially with better benefits for PFOs, or more efficiently
• As the number of these contracts grow, so does the success of the project
• Employment growth in forest sector, whether in public or private sector

Limitations:
• State-owned forests are usually high forests, private forests are often coppice forests, less managed and in the
short term less profitable – the first few years might not see any profit for state nor private forest owners
• If clear ownership cannot be proven, this model most likely cannot work
• Private forests are small (1-3ha average size) and dislocated, therefore a significant amount of neighboring PFOs would have accept this model in order for it to work

8) Please rate the Model 1 on a scale of 1 to 10 (efficiency). Please select only 1 value.

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1 - Least likely to be effective in my country
10 - Most likely to be effective in my country

9) Please rate the Model 1 on a scale of 1 to 10 (applicability). Please select only 1 value.

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1 - Least likely to be effective in my country
10 - Most likely to be effective in my country

10) Please discuss how Model 1 might be applied in your country? What are the major barriers for the functioning of this model? How can it be modified for the specific conditions of your country?

Model 2 – Aggrupation of private forests into larger forest management units through state financial support

Reasoning behind the model:

With the varying development and growth of private forest owners' associations in Bosnia and Herzegovina, Croatia, Serbia and Slovenia, and improving representation of private forest owner's interests on a national governing level, as well as better networking opportunities, many of the barriers that private forest owners experience towards active forest management might be overcome by joint forest management of multiple private forests. This model promotes FSC FM group certification. In this model state's role is minor to moderate.

How does it work?

Members of private forest owners' associations organize themselves into aggrupation of private forests in order to create larger forest areas that can be jointly managed in a sustainable way, without changing the ownership status of particular forests. The private forest owners' association provides all the necessary information that are needed to achieve active forest management as well as group forest certification. The role of state is to finance the costs of certification process during the first 5 years, as well as covering 50% of management costs during the first 2 years.

Advantages:

• Promotion of active forest management as well as benefits of forest certification
• Possibly unmanaged private forest areas become sustainably managed with forest multifunctionality in mind – but without direct state involvement
• Many barriers that are usually present for private forest owners to conduct active forest management are automatically removed
• Rate of illegal cut is decreased
• Combination of financial state support and benefits coming from membership of private forest owners' association minimizes most of the present barriers forest owners experience towards active forest management and certification
• Due to the current state of private forests, there is great potential for bio economy development

Limitations:

• Time frame of 5 years of financial support dictates that aggrupation of private forest owners has a relatively short time to become financially sustainable.

11) Please rate the Model 2 on a scale of 1 to 10 (efficiency). Please select only 1 value.

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1 - Least likely to be effective in my country
10 - Most likely to be effective in my country

12) Please rate the Model 2 on a scale of 1 to 10 (applicability). Please select only 1 value.

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1 - Least likely to be effective in my country
10 - Most likely to be effective in my country

13) Please discuss how Model 2 might be applied in your country? What are the major barriers for the functioning of this model? How can it be modified for the specific conditions of your country?

14) Do you have another model in mind, or a modification/ combination of presented models, that would be effective in accomplishing higher rates of private forest management and certification in your country?

Thank you for your participation and contribution to this questionnaire!

Annex 2 – Questionnaire regarding FSC COC growth opportunities - CBs

1) Please indicate type of FSC certification you provide and countries where you offer your services:

☐ FSC COC in: ☐ Bosnia and Herzegovina ☐ Serbia
☐ Croatia ☐ Slovenia

2) How would you describe your approach to COC market expansion?

☐ Proactive approach
☐ Reactive approach
Additional comments:

3) Which marketing channels do you use to reach new FSC clients?

☐ Direct meeting in the company ☐ Social media ☐ Email marketing
☐ Official website of CB ☐ Word of mouth ☐ Other
☐ Via third parties/promoters/independent consultants
Additional comments:

4) Do you promote FSC certification (on-line or off-line) in order to attracted new clients? If yes, in which specific ways?

5) What are in your opinion the biggest barriers towards further COC certification expansion in AdriaBalkan region?

6) What are the most common reasons why companies that establish communication, finally decide not to become certified?

7) What are the most frequent sources of non-compliance when dealing with new COC clients?

8) How do you think FSC could help you in further COC market expansion?

☐ Initial engagement with potential new CHs

☐ Translation of main COC standards and related documents to be available for CHs or consultants

☐ General promotional material (non-technical)

☐ Follow up communication with CHs after certification

☐ Dedicated market studies and marketing actions in the region

☐ Marketing actions outside the region (with client countries/companies)

☐ Other

Additional comments:

9) Do you wish to provide additional comments not covered by this survey?

Annex 3 – Questionnaire regarding FSC COC growth opportunities – CHs

Thank you for participating in this research developed as a Master thesis at Padova University (Italy), within the framework of the International Erasmus Mundus Master Program in Mediterranean Forestry and Natural Resources Management (MEDfOR). The study is aimed to better understand the current barriers and opportunities for the growth of Chain of custody certification according to the Forest Stewardship Council (FSC) standards in Adria-Balkan region (Bosnia and Herzegovina, Croatia, Serbia, and Slovenia). The questions in this study inquire about your perception of certification, its effects on your company, and national FSC brand awareness.

You have been invited based on the FSC COC certificate that your company holds. While addressing questions, please keep in mind the specific context of your business and your country.

Data collected through this survey will be treated confidentially and anonymously only for purposes of the research, in compliance with the General Data Protection Regulation (GDPR), Regulation (EU) 2016/679. By filling the questionnaire, you give me the permission to process data you provide for the purposes of the research project.

Expected time to complete the questionnaire is estimated under 20 minutes. It will be my pleasure to include you in the Acknowledgement chapter within my thesis. Upon the completion, I would also be glad to share a copy of the thesis with you.

1) Why did you decide to become certified?

2) What do you perceive as main benefits that your company has gained by undergoing the process of FSC COC certification?

3) What do you perceive as main costs that your company has borne by undergoing the process of FSC COC certification?

4) What is the % of certified timber volume of your total annual production (with reference to the last year) in quantity? Estimation is acceptable.

5) Since you have been certified, this % has:
☐ Increased
☐ Remained stable
☐ Decreased

6) What is the % of certified timber volume of your total annual production (with reference to the last year) in value? Estimation is acceptable.

7) Since you have been certified, this % has:
☐ Increased
☐ Remained stable
☐ Decreased

8) What is the % of certified timber you buy and process coming from national sources? An estimation is acceptable.

9) If you source all or part of your certified timber from national sources, please check the boxes that indicate which sources you use. If you feel that some of the sources are not listed, please use the "Other" option to add them. Add as many as you think are necessary.
☐ State forest management companies
☐ Private forest owners
☐ Traders
☐ Other

10) Please name principal reasons why you choose the stated method/s of national certified timber sourcing.

11) Is your production of certified products oriented nationally or internationally?
☐ Only nationally oriented production
☐ Only internationally oriented production
☐ A combination of nationally and internationally oriented production

12) Please list the countries where you sell certified products internationally.

13) Is FSC certification more relevant for your nationally or internationally oriented production? Why?

14) Please rate FSC brand awareness amongst national consumers on a scale from 1 to 10.

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1- Lowest level of brand awareness

10 - Highest level of brand awareness

15) Please justify the answer you provided in the previous question.

16) Do you expect that the FSC brand awareness in your country will significantly improve in the next 10 years?

☐ Yes

☐ Not sure

☐ No

17) Please justify the answer you provided in the previous question.

18) How can FSC brand awareness be improved in your country?

19) Are you planning on remaining FSC certified in the future?

☐ Yes

☐ Not sure

☐ No

20) Please justify the answer you provided in the previous question.

Thank you for your participation and contribution to this questionnaire!