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The contribution of forests in regional development: the role of National Forest Strategy in Greece

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Abstract
The aim of the paper is to assess the recently established National Forest Strategy (NFS) of Greece with regard to its potential to contribute to regional development, taking into consideration the broader institutional framework of the European Union. Whilst forests are natural resources with significant contribution to regional development, the forestry sector in the European Union lacks a Common Policy. Each EU member state implements its own Forest Policy taking into account its legislation framework and the special aspects of the country's forests. The recently legislated NFS determines the principles of forest policy in Greece for the next twenty years 2018-2038, emphasizing on the model of Mediterranean forestry and on sustainable forest management. Increasing the contribution of forests to Greece's Gross Domestic Product is a key target of the NFS, incorporating in the GDP forestry activities strongly related with regional development such as the production of wood and biomass, non wood forest products and forest ecosystems services. Data retrieved from Eurostat regarding the contribution of forests to the Gross Domestic Product of EU countries and data from FAOSTAT regarding the forest products trade balance are used; finally, data retrieved from the Greek Ministry of Environment and Energy, including the expected sources of finance for the accomplishment of the NFS targets are analysed. The results placed Greece in the last places of the ranking of EU countries as to the contribution of forests to the GDP; however, there is ample room for improvements, as the predictions for the financing of the forest sector are quite optimistic.

Keywords: Regional Development, Sustainable Development, Forestry, Forests Products, Government Policy, Ecosystem Services

JEL classifications: R58, Q01, Q23, L73, Q28, Q57

Introduction

Rural regions cover 44% of the EU territory, while 29,1% of the EU population live in rural areas (European Commission, 2020). The role of forests to regional development has been widely documented (Elands and Wiersum, 2001; Hyttinen et al., 2000; Niskanen and Lin, 2000). Regional development often depends on forests (Elands et al., 2004), and multiple use forest management (Toscani and Sekot, 2018). Forests are natural resources that, apart from wood, provide a great variety of non wood forest products, such as mushrooms, aromatic and pharmaceutical plants, resin, fruits, nuts, oils, foliage, peat and game animals that contribute to income enhancement of local population living nearby forest areas (Nerfa et al., 2020). Moreover, forests provide a great variety of services, including recreation, protection from soil erosion, protection of the water resources, contribution to the environmental stability, protection against the climate change with carbon sequestration and the mitigation of global warming, conservation of the biodiversity and many more (Wani and Sahoo, 2021). The important role of forests in the modern era, especially in the battle against climate change, has been widely recognized over a decade ago (Bonan, 2008; Canadell and Raupach, 2008), and the linkages between forests and climate change were thoroughly examined (Devi et al., 2018). Climate change has a severe impact in the economy of the forest sector (Hanewinkel et al., 2013) and therefore the adaptation of forestry strategies against climate change are essential (Yousefpour and Hanewinkel, 2015). The 2030 Agenda for Sustainable Development has devoted one of the seventeen sustainable development goals exclusively to the sustainable management of forests, and their role in reversing land degradation, preventing biodiversity loss and resisting desertification (UN, 2019).

Forests are key enablers for the regional development because they contribute to the creation of employment opportunities, they create an added value to the Gross Domestic Product (GDP) and they improve the quality of life (Czerepko et al., 2016). Moreover, the development of communities based on the forest sector is a multifaceted socioeconomic process (Tykkyläinen et al., 1997). Reforestation and newly forested areas are also increasing the importance of forests in local economy, being part of a broader program for regional development (Barkin and Pailles, 2000). Less favoured areas are strongly benefited by forest products and services, because the local populations stay in the area taking advantage of the new jobs created due to the forestry activities (Kupčák, 2011). Moreover, poor people heavily rely on forest environmental incomes (Vedeld et al., 2007). One of the most important roles of forests in regional development is that they reduce the income disparities and have the potential to ameliorate socio-economic differentials among forest dependent households of different economic status (Rabbi et al., 2010). Cheng et al. (2017) recently developed a systematic map protocol for the contribution of forests to poverty alleviation. The increase of forest land through the implementation of afforestation policies is also a measure to alleviate uneven distribution and generate economic growth in rural areas (Marey-Pérez and Rodríguez-Vicente, 2009). According to Hetemäki and Hurmekoski (2016), the global forest sector can be interpreted to be in a phase of creative destruction, since a decline of production in traditional forest products is observed, while new production opportunities have emerged, such as the prefabricated wood products, having as a result a more diverse forest sector with a broad range of niche market products. The national forest resources are considered as a provider of goods and services. Their sustainable exploitation has traditionally been one of the main objectives of national forest policies across the world. In

addition, the forest sector has the potential to contribute to national economies. Wood products harvested from forests and other wooded land constitute an important component of the productive function. The volume of wood removed indicates the economic and social utility of forest resources to national economies and local communities (FAO, 2006).

Whilst forests are natural resources with significant contribution to regional development, the forestry sector in the European Union lacks a Common Policy. The European's Union Commission has developed the EU Forest Strategy in 2013 in order to provide a coherent framework for the national forest strategies of the members states (EC, 2013). Winkel et al., (2013) reported that the main constraints for the implementation of a common EU forest policy are that it is cross-sectoral, interfering with many other policies in European level such as Agricultural Policy, Rural Development Policy, Environmental Policies, Energy Policy, Climate Change etc, and it lacks effective coordination mechanisms. Moreover, the forest value chain covers a wide range of policy instruments and sectoral interests intersecting that need to be taken into consideration for the development of a comprehensive framework regarding the forest policy in the EU (Aggestam and Pülzl, 2018).
Each EU member state implements its own Forest Policy taking into account its legislation framework and the special aspects of the country's forests (Tsiaras and Andreopoulou, 2020). In Greece a National Forest Strategy (NFS) has been legislated with Ministerial Decision No. 170195/758 of 28 November 2018. The NFS determines the principles of forest policy in Greece for the next twenty years, emphasizing on the model of Mediterranean forestry and on sustainable forest management. The National Forest Strategy of Greece includes seven axes, three horizontal (forestry governance, inventory-monitoring, research-innovation) and four vertical (forest economy, climate change, forest ecosystems protection and ecosystems services optimization, international and European policies). All axes are structured by general goals, directions of actions, and indicators (Ministry of Environment and Energy, Greece http://www.ypeka.gr/). National Forest Strategy of Greece attempted to incorporate the EU Forestry Strategy and its key priorities, taking into consideration unique characteristics of Greek forests such as the protective role of the forests, the multiple role of forests, the significant provision of ecosystem services, the impact of climate change and the efforts for the production of innovative forestry and added-value forest products. Moreover, National Forest Strategy of Greece aspires to face the lack of forest management, one the greatest inefficiencies for Greek forests, and to restore the forests ecosystems, another major environmental issue in Greece (Solomou et al., 2016).

Aiming to address some structural problems of the Greek forest sector, Koulelis (2019) presented some representative actions aimed to thorough reassessment of policies, a more wide-ranging vision, and the inclusion of new parties, such as the energy industry based on bio-economy, in the policy planning process. Increasing the contribution of forests to Greece's Gross Domestic Product is a key target of the NFS, incorporating in the GDP forestry activities strongly related with regional development such as the production of wood and biomass, non wood forest products (mushrooms, resin, nuts, medicinal and aromatic plants) and forest ecosystems services (tourism, recreation). According to NFS vertical target 1: Economy of the forest, timber remains the main source of income from forest ecosystems, while the role of ecosystem services needs to be included in the GDP contribution. Furthermore, a modern legislative

framework is needed for the non wood forest products such as mushrooms and aromatic herbs (NFS, 2018).

The aim of the paper is to assess the contribution of the forest sector to regional development in Greece, considering the recently established National Forest Strategy of Greece with regard to its potential play a part in regional development.

Materials and Methods

Data retrieved from Eurostat regarding the contribution of forests to the Gross Domestic Product of EU countries are used; and also data retrieved from the Greek Ministry of Environment and Energy including the expected sources of finance for the accomplishment of the NFS targets. The data include the output of forestry and connected secondary activities for 26 EU countries for the year 2016, the most recent year with sufficient data for so many countries. Moreover, data regarding Gross Domestic Product at market prices (in current prices, million euro) were used to calculate the contribution of the forest sector in the GDP of each country. The year 2016 was selected for compliance reasons.

The data for output of forestry and connected secondary activities are in current basic prices and are compatible with National Accounts. The output includes all activities that take place on wooded land, while the output of other production activities may be reported as well, if it is produced by a local Kind-of-Activity Unit (KAU) that has forestry and logging as its principal activity, with other secondary connected non-forestry activities (EFA, 2016).

The data are collected as part of European Forest Accounts (EFA), which also covers wooded land, timber, output of the forestry industry by type, and labour input in annual work units (AWU). According to EFA (2016) forest accounts provide a detailed view of forest-related assets such as land and timber, activities (mainly forestry and logging) and flows of wood products. Malta and Luxembourg are the only EU countries that do not provide such data regarding the forestry sector.

The GDP data include the Gross Domestic Product and its main components (output, expenditure and income). The unit of measure is the current price in millions of euro. GDP is a macroeconomic indicator that provides an overall picture of the economic situation and is widely used for policy making (Eurostat, 2019).

The most recent edition (2019) of the EU Regional Competitiveness Index (RCI) was also considered in order to compare the performances of the regions in Greece with other European countries.

Results and Discussion

According to the Regional Competitiveness Index - RCI 2019 (Annoni and Dijkstra, 2019) Greece is one of the most underperforming countries along with Bulgaria and Romania Areas in magenta colour have the worst performance in the RCI 2019 (< -1), areas in green colour achieve the best RCI (> 1), while areas in other colourings are placed between best and worst performances (Figure 1). Among the thirteen regions of Greece only Attiki achieves better performance compared with RCI 2016. All regions of Greece are in worst position compared with their situation in 2010.

Competitiveness and growth are strongly related (Zamparini, 2019). Regional inequalities were always present within the history of the European Union (Ballas et al., 2017; Iammarino et al., 2019), and the recent global financial crisis has definitely intensified these inequalities among the EU countries; the south-east part of the European Union has been affected the most (Bouzarovski and Tirado Herrero, 2017).

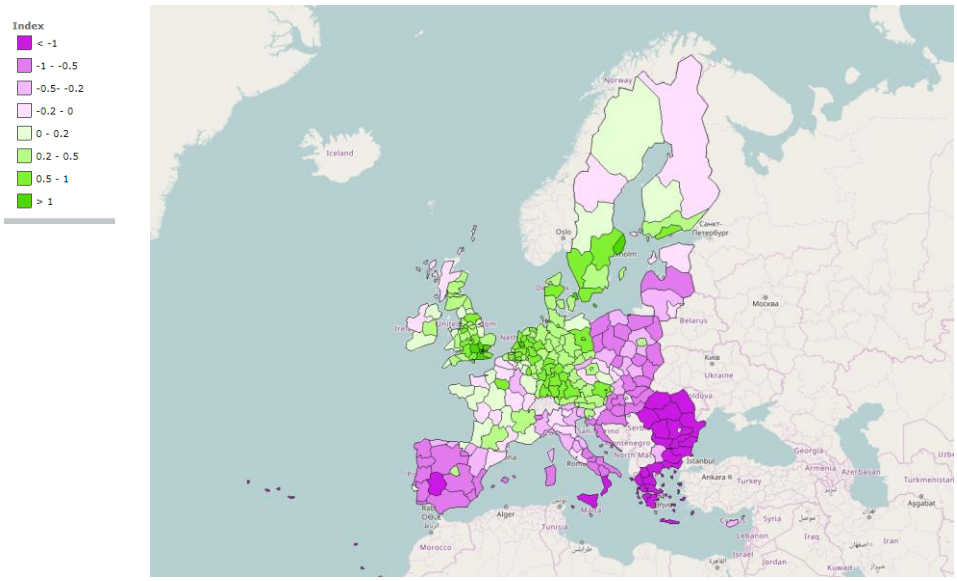

Figure 1: Regional Competitiveness Index - RCI 2019 (Source: Annoni and Dijkstra, 2019)

The forestry sector in Greece has severely affected by the global economic crisis; the levels of forest consumption per capita declined in all cases, mainly due to the collapse of the construction industry during the crisis (Koulelis, 2016), while employment and total output of forestry sector were reduced dramatically between 2008 and 2017 (Tsiaras, 2018). Consequently, Greece is underperforming in the forestry sector during the last years.

A main characteristic of Greece is that most of the forest area is located in areas with high mountains and slopes (making harvesting extremely difficult). The production and often the quality of the produced wood for many managerial and ecological reasons is limited (e.g. a lot of knots). Moreover, Koulelis (2009) placed Greece among low-productivity EU counties. On the other hand, Mediterranean forest ecosystems provide multiple wood and non-wood forest goods and services,

which are crucial for the socioeconomic development of rural areas as well as for the welfare of the urban populations of the Mediterranean region (Palahi et al., 2008).

Wood removals are influenced by a number of parameters such as organizational issues (i.e. harvesting procedures), lack of funding on forest management plans, vague ownership of forest land, problems with forest law compliance, governance issues, bureaucracy, extended illegal logging or generally lack of national forest policy. As a result, the forest products trade deficit in Greece is a characteristic of the national forest sector over time. Greek imports of forest products are more than exports in order to cover domestic consumption (Koulelis, 2012). Figure 2 imprints the situation of the forest products trade balance in Greece during the last 30 years and reveals that the deficit still remains one of the more important issues of the sector.

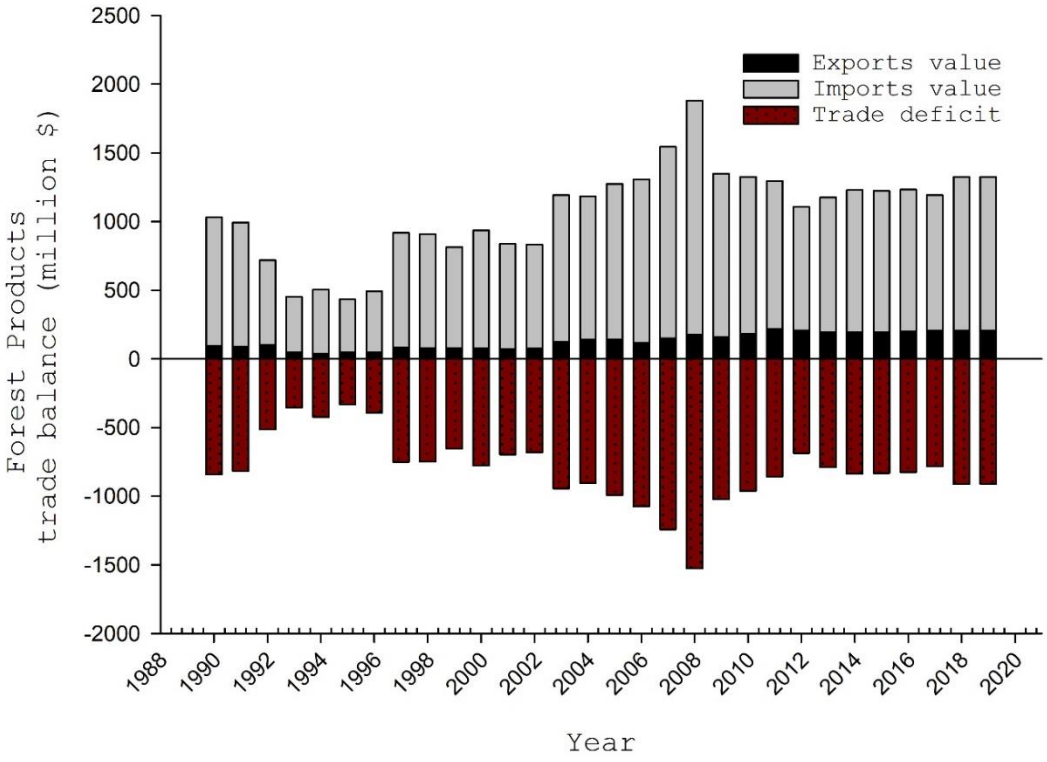

Figure 2: Greek forest sector trade balance and deficit. (Data source: FAOSTAT, 2020)

During all these years, the levels of Greek imports in forest products are high, while the levels of exports are limited and scarce. As a result, the deficit always exceeds €500 million, or even €1500 million in the case of 2008 when the financial crisis began and the forest sector became a side issue, hardly considered by decision makers.

The economic crisis after 2008 resulted in the cutback of funding in all sectors of Greek economy, the forestry sector as well. The forestry sector in Greece is mainly funded by: 1) The Public Investment Program, 2)The Regular Expenditures Budget of the Greek Ministry of Environment, 3) the Green Fund, a legal entity under the Greek Ministry of Environment and 4) The European Structural and Investment Funds (Ministry of

Environment (Greece), 2018). Among these funders, the Green Fund contributes the most to the forestry sector. During 2011-2015, however, the Green Fund has reduced its funding by about 45% (Figure 3).

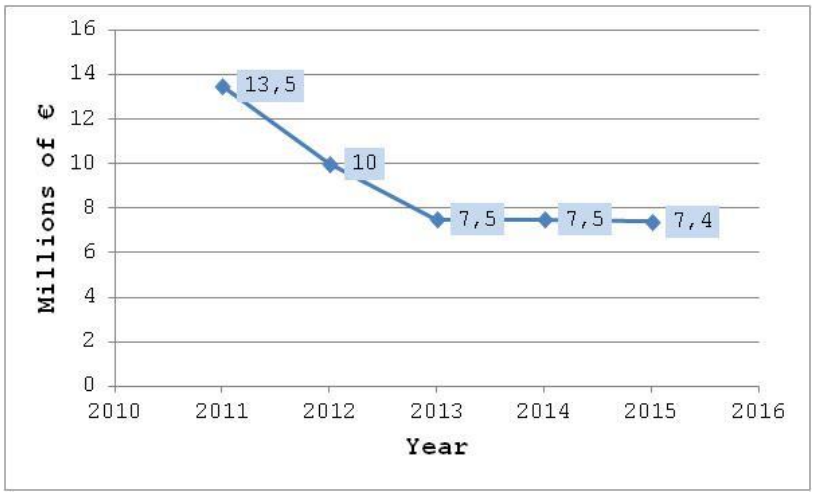

Figure 3: Green Fund expenditures (in million €) regarding Forest Protection for the years 2011-2015 (Source: Ministry of Environment and Energy Greece, 2015)

Table 1 presents the output of forestry sector and the Gross Domestic Product for European Union countries in year 2016.

Table 1: EU countries: Output of forestry and GDP in year 2016 (Million euro), Source: Eurostat

Country	Output of forestry 2016 (Million euro)	GDP at market prices 2016 (Million euro)
European Union (28 countries)	50.501.159	14.984.271,9
Belgium	427,20	430.372,1
Bulgaria	719,83	48.620,5
Czech Republic	2.487,01	176.370,1
Denmark	554,00	282.090,0
Germany	8.576,33	3.134.100,0
Estonia	707,90	21.693,6
Ireland	427,80	271.683,6
Greece	85,30	176.487,9
Spain	1.365,00	1.113.840,0
France	6.646,40	2.234.129,0
Croatia	307,05	46.615,5
Italy	2.599,00	1.695.590,1
Cyprus	3,90	18.872,9
Latvia	931,7	25.072,6
Lithuania	423,54	38.893,4
Hungary	499,9	115.259,2
Netherlands	262,99	708.337,0
Austria	2.255,11	357.299,7
Poland	5.078,41	426.555,7
Portugal	1.216,93	186.489,8

Romania	1.721,75	170.393,6
Slovenia	548,64	40.366,6
Slovakia	1.248,95	81.038,4
Finland	4.855,00	217.484,0
Sweden	4.610,99	466.347,6
United Kingdom	1.908,53	2.435.055,2

Germany and France, the two strongest economies in the European Union, have the biggest output of forestry sector in the year 2016, followed by Poland, Finland and Sweden, countries that are traditionally depend on the forestry sector. Greece on the other hand is placed at the bottom of the ranking; only the forestry sector in Cyprus has a smaller output, but Cyprus has the smallest GDP in market prices among the examined countries in the EU. Greece has a larger GDP than ten (10) countries in the EU: Czech Republic, Romania, Hungary, Slovakia, Bulgaria, Croatia, Slovenia, Lithuania, Latvia, Esthonia, and Cyprus. Koulelis (2009) has also placed Greece among EU countries with low productivity regarding primary roundwood production.

Table 2 was created using data in Table 1 and provides the ranking of EU countries based on the contribution of forest sector to the Gross Domestic Product of each country.

Table 2: Ranking of EU countries based on the contribution of forest sector to the Gross Domestic Product (Processed data retrieved by Eurostat)

Ranking	**Country**	**%**
1	Latvia	3,72
2	Estonia	3,26
3	Finland	2,23
4	Slovakia	1,54
5	Bulgaria	1,48
6	Czech Republic	1,41
7	Slovenia	1,36
8	Poland	1,19
9	Lithuania	1,09
10	Romania	1,01
11	Sweden	0,99
12	Croatia	0,66
13	Portugal	0,65
14	Austria	0,63
15	Hungary	0,43
16	France	0,30
17	Germany	0,27
18	Denmark	0,20
19	Ireland	0,16
20	Italy	0,15
21	Spain	0,12
22	Belgium	0,10
23	United Kingdom	0,06
24	Greece	0,05
25	Netherlands	0,04
26	Cyprus	0,02

Greece is ranked 24th among the 26 countries of the European Union that provide sufficient data on the contribution of forest sector to their Gross Domestic Product (0,04%). Cyprus is in the last place, with a

contribution of only 0,02% of the forest sector to its Gross Domestic Product. On the contrary, two Baltic countries, Latvia and Estonia, have the largest contribution of the forest sector to their Gross Domestic Product; Finland, a country in which traditionally the forest sector is an important employer (Hyttinen et al., 1998), follows with a 2,23% GDP contribution. Overall, ten (10) countries have more than 1% contribution of forests to the GDP and fourteen (14) countries have more than 0,5% contribution of forests to the GDP, while the average contribution of forest sector to the Gross Domestic Product for the examined EU countries is 0,89%.

Table 3 presents the ranking of EU countries based on the gross value added in the economic activities of agriculture, forestry and fishing for the year 2019.

Table 3: Ranking of EU countries based on the gross value added in the economic activities of agriculture, forestry and fishing for the year 2019 (Eurostat, 2020)

Ranking	**Country**	**Chain linked volumes, index 2005=100 Year 2019**
1	Slovakia	305,1
2	Ireland	166,7
3	Finland	132,9
4	Spain	132,4
5	Estonia	126,4
6	Slovenia	125,3
7	Latvia	124,7
8	Austria	122,2
9	Netherlands	119,3
10	Sweden	115,9
11	Lithuania	115,6
12	Romania	115,3
13	Denmark	114,9
14	France	112,6
15	Portugal	111,2
16	United Kingdom	109,0
17	Hungary	104,4
18	Italy	100,7
19	Belgium	95,9
20	Germany	95,9
21	Greece	94,2
22	Czechia	93,5
23	Poland	93,1
24	Bulgaria	87,8
25	Croatia	80,8
26	Malta	72,6
27	Cyprus	65,5
28	Luxembourg	63,5

Greece is ranked 21st among the 28 countries of the European Union, failing to catch the chain linked volume of 100 (base year 2005). Greece shows poor performance regarding the gross value added in the economic activities of forestry, but there is ample room for improvement.

More traditional assessments of forest production focused more on timber supply, but the modern concept of forest production has since widened

to encompass all types of wood, non-wood forest products and services as well (i.e. watershed protection, carbon fixation, soil creation, biodiversity conservation. Regarding non-wood forest products in Mediterranean countries Masiero (2016) stated that understanding the true value of natural resources, for both land users and policymakers, is an essential step for promoting their protection and sustainable use. He estimated that the total value for non-wood forest products (NWFP) production by Mediterranean forests is €822.4 M (Masiero, 2016). This particular study put Greece in the North-Eastern Mediterranean (NEM) sub region of Mediterranean countries. It was estimated that NEM sub-region accounts for 7.3-7.9% of the total estimated value of the total value for selected products/services at regional level, with Croatia, Bosnia and Herzegovina, and Greece as main contributors (85% of sub-regional total, 6% at Mediterranean scale) revealing new prospects of profitability in the longer term from this sector.

The new national forest strategy is focused on a more effective participation of the forest sector to the Greek GDP. The unofficial and quite ambitious target of the Ministry is 1% of the GDP. In order to achieve this target, the participation of rural communities and investments in forestry is necessary. Given the particular characteristics of the sector and modern challenges such as climate change and the fragility of Mediterranean forests, the implementation of this modern strategy will not be a simple case (Koulelis, 2017).

Conclusions

Greece achieves poor performance in the output of forestry sector in absolute numbers; only Cyprus performs worst than Greece, however Cyprus is a significantly smaller country. Moreover, in the ranking of the EU countries based on their contribution of forest sector to the Gross Domestic Product Greece is found in the third place from the bottom of the classification, as the Greek forest sector contributes to the country's GDP only a minimal percentage of 0,05%. The only two countries performing worst than Greece are the Netherlands and Cyprus. However, Cyprus is the weakest economy among the examined EU countries and the Netherlands has the smallest forest area (% of land area) in the EU (Source: The World Bank, 2016). Greece also shows poor performance regarding the gross value added in the economic activities of forestry. The forest products trade deficit in Greece is a main characteristic of the national forest sector over time and results to low contribution to the national economy. On the other hand, new prospects of development of the non-wood forest products and forest services sector is feasible and desirable.

The general tendency of Greek governments for expenditure reduction during the years of the economic crisis is another obstacle for the forest sector. Green Fund, one of the greatest investors for the forest sector in Greece, has cut its funding approximately in half during the years 2011-2015, the Green Fund, further encumbering an increase of the contribution of the forest sector to the country's GDP. The country's poor performance according to the most recent Regional Competitiveness Index of the EU aggravates the problem.

Despite the aforementioned hindrances for the forest sector in Greece, there is ample room for improvement. The recent legislation of National Forest Strategy in Greece (28/11/2018) provides a great opportunity for increasing the contribution of forest sector in the Gross Domestic

Product of Greece. The former leadership of the Ministry of Environment, Energy and Climate Change in Greece has set an ambitious goal on the occasion of the announcement of National Forest Strategy, namely that the contribution of forests will reach 1% of the GDP eventually.

The Mediterranean forestry model, adopted by the newly minted National Forest Strategy of Greece, is well adjusted to the local conditions, enhancing the multiple role of forests. One of its key characteristics is that it promotes the cooperation with rural communities, leading to local development and job opportunities that subsequently can increase the contribution of the forest sector to the country's Gross Domestic Product. However, the structural problems of the Greek forest sector cannot be resolved quickly. In the contrary, they require in-depth policy changes, reprogramming of forest funds, promotion of new investments, and restrict implementation of the new wide-ranging vision of the NFP.

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