Sustainability Constraints in Greece. Focusing on Forest Management and Biodiversity

Panagiotis Koulelis[1], Alexandra Solomou[2], Vasilia Fassouli[3]

[1]Institute of Mediterranean Forest Ecosystems, Hellenic Agriculture Organization Demeter, Greece; e-mail: pkoulelis@fria.gr
[2]Institute of Mediterranean Forest Ecosystems, Hellenic Agriculture Organization Demeter, Greece; e-mail: solomou@fria.gr
[3]Institute of Mediterranean Forest Ecosystems, Hellenic Agriculture Organization Demeter, Greece; e-mail: vasfas@aua.gr

Abstract. The forest policy in Greece and the current regulatory framework is not efficient to support the implementation of sustainability at a satisfactory level. The main scope of this study is to present, analyze and evaluate legislation and practices that are likely to play the role of constraints towards sustainability. The hypothesis is that common practices in the forest field combined with inefficient and obsolete legislation are responsible for delays in the implementation of a national forest policy which will promote sustainability. A systematic methodology was applied so to ensure a rigorous and repeatable method of sustainability constraints identification and evaluation. The identification of constraints can promote the improvement of legislation, the revision of common practices concerning the forest sector and finally can help the forest managers to understand better how to work effectively within legal, regulatory, and operational environments deriving from forest policy.

Keywords: Forest management; biodiversity; constraints; sustainability; SDGs; Greece.

1 Introduction

Sustainable Development Goals (SDGs) were set by the United Nations (UN) in 2015, when 193 countries adopted an agenda, comprising of 17 Goals and 169 Targets, which are "integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental" (UN, 2015). The Goals and Targets encourage global, national and local level actions to be taken over 2030, affecting all critical areas of humanity. They entail challenges regarding coordination, responsibility, planning, arrangement, expertise and commitment (Allen et al., 2018). Forests and biodiversity are vital for achieving the SDGs, as they are significantly interlinked with food, energy production, health, water, economy, climate etc. In the SDGs, forests are mentioned in specific targets of Goal 6 (Clean Water and Sanitation) and Goal 15 (Life on Land). More precisely, SDG 6 mentions the protection of forests in Target 6.6, which focuses at "*protecting and restoring water-related ecosystems,*

Proceedings of the 9th International Conference on Information and Communication Technologies in Agriculture, Food & Environment (HAICTA 2020), Thessaloniki, Greece, September 24-27, 2020.

including mountains, forests etc." (UN, 2015). SDG 15 focuses on "*the protection, restoration and promotion of sustainable use of terrestrial ecosystems and sustainable forest management as well as halting and reversing the loss of biodiversity and land degradation*". To accomplish Goal 15, UN members have to achieve 12 targets, from which 3 refer directly to forests (15.1, 15.2 and 15.B) (table 1) and 7 to biodiversity (15.1, 15.4, 15.5, 15.7, 15.8, 15.9, 15.A) (table 2).

According to the Sustainable Development Goals Report 2019 (UN, 2019), biodiversity loss is critical, with approximately one million species facing extinction. Concerning the implementation of the Agenda, the report depicts an unavailability of implementation means and financing (UN, 2019). Concerning forests and biodiversity in Goal 15, globally, there are some promising trends, portraying the increase of terrestrial ecosystems and biodiversity protection (plus financial assistance) and the decrease of forest loss. On the other hand, biodiversity loss continues, and efforts for protection and restoration of ecosystems and species, are frustrated due to invasive species and poaching and trafficking of wildlife. A beating alarm, clearly portrayed in the Report (UN, 2019), is the deterioration of the Red List Index (risk of extinction), from 0.82 in 1993 to 0.73 globally in 2019 (a value of 1 indicates no threat, and a value of 0 indicates that all species are extinct).

1.1 Current situation in forest management

Based on table 1, more concern is given by the SDGs in conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, particularly forest ecosystems, aiming to promote the implementation of sustainable management, halt deforestation, restore degraded forests and increase afforestation and reforestation. Finally, target 15D underlines the need for stable financial support to sustainable forest management. According to Spanos et al. (2015), the main forest management approaches in Greece are wood and non-wood production, like resin, honey, wild plants, livestock etc. Additionally, attention is given to the social uses like wildlife, recreation and hunting. Considered that more than 63.5% of the forests are state-owned, 12% are owned by local communities and the rest 22.5% are privately-owned (by monasteries or individuals etc.), the major stakeholder of the Greek forests is the state (FRA, 2015). Thus, Greek authorities are responsible for the long-term implementation of SDGs and for the implementation and the updating of the legislation and practices that are common in the forest sector. Even with the management of private owned forests, the final management plan must be authorized by the local forest service, considering that same laws are applied in public and in private forests. This type of administration seems to be very state-centered, followed by weaknesses like bureaucracy or slow decision-making. On the other hand, this administration offers a relative security in terms of strict law enforcement and the protection of the forests.

Table 1. Targets aiming to Goal 15 regarding forests.

		15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	FOREST RELATED TARGETS	**15.2** By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.
		15.B Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.

Table 2. Targets aiming to Goal 15 regarding biodiversity.

		15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
		15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.
		15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	BIODIVERSITY RELATED TARGETS	**15.7** Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.

	15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.
	15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
	15.A Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems
	15.C Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

1.2 Current situation in biodiversity

The protection of the natural and cultural environment is a state obligation and a citizen's right, protected by the Greek Constitution (Article 24) and by various legislative initiatives, which cover a plethora of environmental aspects, such as forest management (Forest Code of Greece), species protection, conservation of indigenous farm animal breeds, structured environment, protected areas etc. Greece is considered as a biodiversity "hot-spot", with more than 6200 endemic species (Legakis, 2010; Georgiou and Delipetrou, 2011) and as one of the most important endemic centers in Europe and the Mediterranean, with 1278 endemic species (22.2% of the total number of species) and 452 endemic subspecies, representing 1461 taxa (22.1% of the total taxa number). Regarding its fauna, 23130 species of land and freshwater animals have

been recorded so far, of which 3956 are endemic, as well as another 3500 marine species (Fauna Europaea Web Service, 2004; Legakis and Maragkou, 2009). Regarding biodiversity and its conservation, law 3937 stands in the country from 2011 (Greek OJ number 60/A of 31.03.2011), and its status is constantly monitored by the Ministry of Environment and Energy. In 2014 a National Strategy for biodiversity was approved to be implemented until 2029 (Greek OJ number 2383 of 8.11.2014), (HLPF, 2018). In 2017, Law 4495/2017 was approved for the Control and Protection of the Structured Environment (Greek OJ number 167/A of 3.11.2017), and JMD 50743/2017 for the Revision of the national catalog of areas falling under the European Ecological Network Natura 2000 (Joint Ministerial Decision number 4432/B of 15.12.2017).

2 Materials and methods

Aiming to a systematic research to discover the necessary knowledge through describing, explaining the sustainability context at national level (regarding current practices in forest management and biodiversity protection), a document analysis was adopted. Document analysis is a systematic procedure for reviewing or evaluating documents—both printed and electronic (computer-based and Internet-transmitted) material, which requires that data are examined and interpreted to elicit meaning, gain understanding, and develop empirical knowledge (Corbin & Strauss, 2008; Rapley, 2007). As Bowen (2009) reports, documents that may be used for systematic evaluation as part of a study, take a variety of forms. The approach of this study mostly follows public records of legislation, press releases, papers, books and journals which are related to forest management and biodiversity protection. Following that, the study employs literature reviewing, personal practical knowledge and statements of the authors as well, to achieve convergence and corroboration.

3 Results and Discussion

A thorough, systematic review of documentation provided background information is presented in graph 1, aiming to list, interpret and understand important constraints. Target 15.B points towards financing sustainable forest management and mobilizing significant resources. In contrast, Spanos et al., (2015) reported the issue of the weak financing in forestry in general and the lack of investment in the exploitation of the potential of forest resources. The issue of poor financing seems to be listed also at the national forestry strategic plan (2018) (Article 7). In addition, Kazana et al. (2015) includes the lack of funds in forest management plan studies and Koulelis (2011) referred that the motives offered for private investments in the timber sector are deficient. Targets 15.1 and 15.2. promote the implementation of sustainable forest management of all types of forests. Spanos et al. (2015) reported that in Greece the logging system is problematic, with deficiencies in the organization of wood harvesting in forests, and significant negative effects, both on forestry working

operations and the forest. They claimed that practices like substantial supervision by foresters play their negative role. Furthermore, inefficient and outdated management practices make it difficult to continue logging operations and forest production especially in environmentally sensitive areas (N. 2000 Network, National Parks, Aesthetic Forests). The high cost and the outdated methods of harvesting and production, the highland terrain of the Greek mountains and the low level of automation in harvesting increase production and transportation costs (Koulelis, 2016). Kazana et al. (2015) also adds the exploitation system of public forest and the outdated forest management plans standards in the weaknesses factors of a SWOT analysis for sustainable forest management and monitoring in Northern Greece. Moreover, deficiencies in the information system and statistical forestry, an administration system of forestry services not performing well and incomplete support for forestry research are reported by Spanos et al. (2016). The lack of know-how (new technologies and tools) and inefficient forestry legislation is reported by Kazana et al. (2015), while complicated forest legislation is reported by Solomou et al. (2016). Incomplete support for forestry research is also reported by Spanos et al. (2016). The authors' view on this issue converges. Forest research enhances the protection and exploitation of the national forest resources at the same time.

Inadequate standardization of forest products, problematic exploitation of timber and other forest products, lack of modern systems in quality certification of wood and forest management, are some expressions of the common observed constraint of the lack of a national forest products certification system (Georgiadis & Cooper, 2007; Koulelis, 2011; Kazana et al., 2015; Spanos et al., 2016). The above-mentioned constraints may be validated, as recently, in 2018, a National Strategy for Forests was established in Greece (The National Forestry Strategic Development Plan 2018-2038), to address them through respective actions.

Regarding biodiversity constraints, Solomou (2013) reported insufficient scientific data on the individual components of biodiversity and the trends that characterize them, thus appropriate measures, such as optimizing the demarcation of protected areas are necessary. Dimopoulos et al. (2006) denoted that the lack of monitoring data can reduce the capacity for informed decision-making towards conservation targets.

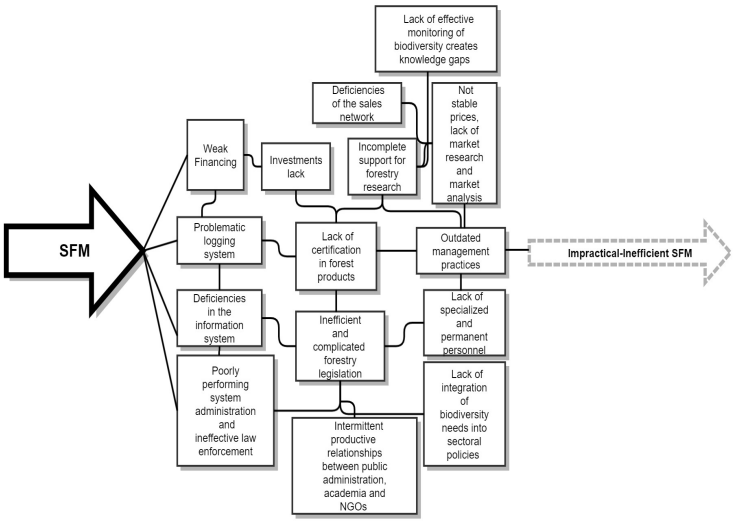

Fig. 1. National constraints towards forests sustainability.

According to Solomou and Sfougaris (2011), it is crucial to detect spatial–temporal biodiversity changes through monitoring for better allocation of conservation efforts and assessment of the progress towards relevant targets.

Additionally, National Strategy & Action Plan for Biodiversity (2014) focused on the partial (or non) implementation of the existing institutional framework, which enables various illegal activities to occur, such as: poaching, overfishing, etc. Also, the lack of adequate environmental education/awareness of those engaged in productive activities do not allow them to make environmentally friendly choices. Moreover, several important biodiversity constraints such as a) the non - integration of sustainability principles in productive activities, b) the lack of stable funding, understaffing of protected area management structures, c) the lack of specialized and adequately staffed related services at central and regional level. (Solomou & Sfougaris 2011; National Strategy & Action Plan for Biodiversity, 2014; EKBY 2020; Nature and biodiversity of Greece 2020; Solomou 2013).

4 Conclusions

Constraints such as lack of resources by the government, bureaucracy, lack of investments and a forest certification system, weak private forest sector and inefficient logging system were detected. Likewise, the lack of effective monitoring of biodiversity, knowledge gaps, poorly performing system administration and the ineffective law enforcement simultaneously with the intermittent productive relationships between public administration, academia and other authorities were detected as the most common constraints towards sustainability. One main vision of the National Strategy is to "Ensure sustainability and increase the

contribution of forest ecosystems to the country's economy through multifunctionality, adaptability and strengthening their socio-economic role" (Article 2), a vision totally compatible with the SDG 15 and its targets. From now on, it must be proven in time that all these proposed actions will be implemented. Any new forestry-related legislation submitted for voting should consider both the SDGs and the national strategy vision.

References

1. Bowen, G. (2009) Document Analysis as a Qualitative Research Method. Qualitative Research Journal, Vol. 9 No. 2, pp. 27-40. https://doi.org/10.3316/QRJ0902027
2. Butchart, S.H.M., Walpole, M., Collen, B. (2010) Global biodiversity: indicators of recent declines. Science 328:1164–1168
3. CBD (2010) Decision X/2, the strategic plan for biodiversity 2011–2020 and the Aichi biodiversity targets. Nagoya, Japan, 18–29 Oct 2010
4. CITES (1983) Convention on International Trade in Endangered Species of Wild Fauna and Flora. Available at: https://www.cites.org/sites/default/files/eng/disc/CITES-Convention-EN.pdf
5. Corbin, J. & Strauss, A. (2008) Basics of qualitative research: Techniques and procedures for developing grounded theory (3rd ed.). Thousand Oaks, CA: Sage.
6. Denzin, N. K. (1970) The research act: A theoretical introduction to sociological methods. New York: Aldine
7. DeWan, A.A., Zipkin, E.F. (2010) An integrated sampling and analysis approach for improved biodiversity monitoring. Environ. Manag. 45:1223–1230
8. Dimopoulos P., Bergmeier E., Fishcer. P. (2006) Natura 2000 habitat types of Greece evaluated in the light of distribution, threat and responsibility. Biology and Environment 106B: 175-187.
9. FAO/FRA (2015) Global Forest resources assessment, country report, Greece Rome 2014
10. Fauna Europaea Web Service (2004) Fauna Europaea version 1.1. Available at http://www.faunaeur.org
11. Georgiadis, N.M., Cooper, R.J. (2007) Development of a forest certification standard compatible with PEFC and FSC's management requirements. A case study from Greece. Forestry, Oxford Journals 80(2):113–135
12. Georgiou, K. and Delipetrou, P. (2011) CHLORIS database: Endemic, Threatened and Protected plants of Greece, University of Athens.
13. Greek Biotope/Wetland Centre (EKBY) (2020) Viewed 21 June 2020, http://www.ekby.gr/ekby/el/EKBY_biodiversity_el.html
14. High-level Political Forum, United Nations (2020) Viewed 14 May 2020, https://sustainabledevelopment.un.org/hlpf/2018

15. Karavitis, C.A., Tsesmelis, D.E., Skondras, N.A., Stamatakos, D., Alexandris, S., Fassouli, V., Vasilakou C.G., Oikonomou, P.D., Gregoričc, G., Grigg, N.S., and Vlachos, E.C. (2014) Linking drought characteristics to impacts on a spatial and temporal scale. Water Policy 16 (2014) 1172–1197.
16. Kazana, V., Kazaklis, A., Stamatiou, C., Koutsona, P., Boutsimea, A., & Fotakis, D. (2015) SWOT analysis for sustainable forest policy and management: A Greek case study. International Journal of Information and Decision Sciences, 7(1), 32–50. https://doi.org/10.1504/IJIDS.2015.068116
17. Koulelis, P.P. (2011) Greek timber industries and wood product markets over the last century: Development constraints and future directions. Annals of Forest Research.
18. Koulelis, P.P. (2016) Forest products consumption and trade deficit in Greece during the financial crisis: a quantitative statistical analysis. OJBM April:258–265
19. Koulelis, P.P. (2019) Restructuring the Greek Forest Sector in Order to Facilitate Rural Development in Greece. https://doi.org/10.1007/978-3-030-02312-6_2
20. Legakis, A. (2010) Threatened, Protected and Endemic species of Greece, zoological museum, department of biology, University of Athens.
21. Legakis, A. and Maragkou, P. (2009) The Red Book of Endangered Animals of Greece. Hellenic Zoological Society, Athens, p. 528.
22. Mergos, G. and Patsavos, P. (2017) Cultural Heritage and Sustainable Development. Technical University of Crete.
23. Ministry of Environment, Energy & Climate Change (2014) National Strategy & Action Plan for Biodiversity. https://www.cbd.int/doc/world/gr/gr-nbsap-01-en.pdf
24. Nature and Biodiversity of Greece (2020) Viewed on 15 June 2020 http://biodiversity-info.gr/
25. Pereira, H.M., Cooper, H.D. (2006) Towards the global monitoring of biodiversity change. Trends Ecol Evol 21:123–129.
26. Pereira, H.M., Ferrier, S., Walters, M. (2013) Essential biodiversity variables. Science 339:377–378.
27. Rapley, T. (2007) Doing conversation, discourse and document analysis. London: Sage.
28. Sfakianaki, E., Iliadis, T., Zafeiris, E. (2015) Crisis management under an economic recession in construction: the Greek case. Int J Manag Decis Mak 14:373–389 https://doi.org/10.1504/ Ijmdm.2015.074015
29. Sfenthourakis, S., Legakis, S., Spyropoulou, S. (1998) First national report on the convention on biological diversity, Greece. Ministry of Environment, Physical Planning and Public Works, General Directorate for Environment, Environmental Planning Division, Natural Environment Management Section, Athens
30. Solomou, A. (2013) Effects of management practices in succession of olive groves ecosystems. Phd thesis. University of Thessaly, Department of Agriculture Crop Production and Rural Environment. 291 p.

31. Solomou, A., Karetsos, G., Skoufogianni, E., Martinos, K., Sfouggaris, A. (2015) Assessment of Greek Forests Protection and Management. 10.1007/978-3-319-20110-8_10. in Zhelezov, G. (2015). Sustainable development in mountain regions: Southeastern Europe, second edition. Sustainable Development in Mountain Regions: Southeastern Europe, Second Edition, 1–404. https://doi.org/10.1007/978-3-319-20110-8
32. Solomou, A., Martinos, K., Skoufogianni, E., Danalatos, N. (2016) Medicinal and Aromatic Plants Diversity in Greece and Their Future Prospects: A Review. Agricultural Science 4, 9-20.
33. Solomou, A.D., Sfougaris, A. (2011) Comparing conventional and organic olive groves in central Greece: plant and bird diversity and abundance. Renewable Agriculture and Food Systems: 26(4); 297-316
34. Spanos, I., Meliadis, I., Platis, P., Mantzanas, K., Samara, T., Meliadis, M. (2015) Forest Land Ownership Change in Greece. COST Action FP1201 FACESMAP Country Report, European Forest Institute Central-East and South-East European Regional Office, Vienna. 31 pages. [Online publication]
35. Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O., Ludwig, C. (2015) The trajectory of the Anthropocene: The great acceleration. The Anthropocene Review 2(1):81–98.
36. Tittensor, D.P., Walpole, M., Hill, S.L. (2014) A mid-term analysis of progress toward international biodiversity targets. Science 346:241–244.
37. UN (2019) Report of the Secretary-General on SDG Progress 2019 Special Edition. United Nations, New York 2019. Available at: https://sustainabledevelopment.un.org/content/documents/24978Report_of_the_SG_on_SDG_Progress_2019.pdf
38. UN (2020) Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development. Refinement 2020. Available at: https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202020%20review_Eng.pdf
39. UN General Assembly (2015) Resolution Adopted by the General Assembly on 25 September 2015. Available at: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (2015), Accessed Nov 2017 (New York)
40. UN General Assembly (2017) Resolution adopted by the General Assembly on 6 July 2017. Available at: https://undocs.org/A/RES/71/313
41. Voluntary National Review on the Implementation of the 2030 Agenda for Sustainable Development Greece I, July 2018. General Secretariat of the Government Office of Coordination, Institutional, International & European Affairs. ISBN: 978-618-80745-1-4. Available at: https://sustainabledevelopment.un.org/content/documents/19378Greece_VNR_Greece_2018_pdf_FINAL_140618.pdf
42. Wiersum, F., Elands, B., Hoogtra, M. (2005) Small Scale forest ownership across Europe: Characteristics and future potential. Small-scale Forestry 4(1), 1-19.

43. WWF (2011) GREEK FORESTRY a great advantage for the Greek economy, [Online], Available: www.wwf.gr/old/index.php?option=com_content&view=article&id=368:2010-05-21-12-31-14&catid=70:2008-09-16-12-10-46&Itemid=90 [30 June 2014]