

Measuring and Monitoring Sustainability Trends in the Mediterranean: The Ecological Footprint Viewpoint

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Living well within the limits of the planet is the overarching goal of sustainable development. The Mediterranean Strategy for Sustainable Development is centred upon this vision and progress toward it can be monitored through a framework that sets two targets, one based on Ecological Footprint Accounting and one on the Human Development Index. Unfortunately, no Mediterranean country has met both targets as of 2013, to the detriment of increasing pressure on natural resources. The Ecological Footprint can play a crucial role in supporting national policies as well as monitoring sustainability at large, as is happening in Montenegro. Besides, there are two specific components, food and transport, making up half the share of the Mediterranean Ecological Footprint and targeting them can offer the opportunity to have the greatest impact on the region.

Background

In September 2015, Sustainable Development became the centre of the 2030 Agenda of the United Nations for transforming our world. The priority of the Agenda has been to identify and set 17 Sustainable Development Goals (SDGs) and 169 targets with the overall objectives to end poverty, fight inequality and injustice, and tackle climate change. A global framework focused on measurable outcomes has also been developed and agreed upon. It is composed of 241 indicators for monitoring global progress toward the SDGs. The Agenda 2030 represents a great collective work to comprehensively ad-

dress multiple goals of achieving well-being at different layers, including people, planet, prosperity and peace (UN, 2015).

However, by using hundreds of measures to track progress towards the SDGs, the global Agenda 2030 process – and its related policy strategies – could run the risk of overlooking the overarching goal of sustainability: an integrated well-being balanced among the three components of sustainable development (i.e. economy, society and environment) (Costanza et al., 2014).

Human development depends on the natural capacity of our limited planet to sustain our lives and activities. This makes the three

components of sustainability hierarchically ordered, with the natural environment (i.e. natural capital) at the very base of society and economy (Wackernagel et al., 2017; Pulselli et al., 2015).

In line with the UN directions for the regional and national implementation of the Agenda 2030, in 2016 the Mediterranean region adopted its Strategy for Sustainable Development for the period 2016-2025 (MSSD). Consistent with the SDGs, the MSSD aims at providing a strategic policy framework for securing a sustainable future in the region, following its core vision: “A prosperous and peaceful Mediterranean region in which people enjoy a high quality of life and where sustainable development takes place within the carrying capacity of healthy ecosystems.” (UNEP MAP, 2016).

Unlike the Agenda 2030, the need to operate within the planet’s ecological limits is explicitly mentioned in the MSSD. The Mediterranean is one of the world’s richest regions based on ecosystem and species diversity; it is also characterised by a unique geography where multiple cultures live and co-exist. However, unsustainable consumption and development trends are threatening the ecological assets that are the Mediterranean region’s most valuable sources of strength (GFN, 2015). For this reason, the strategy is specifically centred upon environmental sustainability, as achieving long-term socioeconomic development requires taking full account of global and regional bio-physical limits at all levels of the decision-making process (UNEP MAP, 2016).

Progress towards the key vision of the MSSD – briefly expressed as *living well within the limits of the planet* – can be monitored through a framework that combines the United Nations’ Human Development Index (HDI) with Global Footprint Network’s Ecological Footprint Accounting (GFN, 2015). HDI is based on the life expectancy, education and

income of a nation’s residents. On a scale of zero to one, UNDP defines 0.7 as the threshold for a high level of development (0.8 for very high development). The requirement “within the means of nature” is tracked by the Ecological Footprint. Ecological Footprint Account reflects the resources needed to sustain this development in the long run. An Ecological Footprint per Mediterranean resident should not exceed the amount of biocapacity available per person in the Mediterranean, which is 1.2 global hectares (gha) (GFN, 2015).

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No country in the Mediterranean fits within the minimum sustainable development quadrant (the shaded blue area in Chart 1), in which the per capita Ecological Footprint value is lower than the regional biocapacity (thus measuring the “*within the limits*” part of the vision) and the HDI is greater than 0.7 (measuring the “*living well*” part). Moreover, over time, the majority of Mediterranean countries have improved their residents’ quality of life – the region’s HDI rose from medium (HDI=0.70) to high levels (HDI=0.76). However, this appears to come at the expense of increased anthropogenic pressures on ecosystems, as the region’s average per capita Footprint rose from 2.2 gha in 1961 to 3.3 gha in 2013.

Ecological Footprint Accounting in the Mediterranean Region

The Ecological Footprint is an accounting metric able to quantify humanity’s use of key planetary ecosystem services. It tracks competing demands for biologically productive space

needed to produce the natural resources and services that a population consumes: area for crops, fish, livestock, fibre, timber, the sequestration of excessive CO₂ from fossil fuels, and productive areas paved over for the construction of cities and roads (see Figure 1). This aggregate demand can be compared with the capacity of ecosystems to supply the same natural resources and services, namely their biocapacity. Ecological Footprint and biocapacity metrics are expressed in hectare equivalent units or global hectares, which are hectares of land with world average productivity; this allows results to be comparable across countries of the world (Borucke et al., 2013; Galli & Halle, 2014).

Ecological Footprint Accounting shows that the entire region is running an ecological deficit: Mediterranean countries today demand approximately 2.5 times more natural resources and ecological services than the region's ecosystems can provide

If a population's Ecological Footprint exceeds the region's biocapacity, that region runs an ecological deficit (GFN, 2015). This situation occurs because people can emit more CO₂ than the land and the oceans sequester, trees can be cut more quickly than they regrow, and fish can be harvested faster than they restock. At the global level, latest results show that humanity's Ecological Footprint is exceeding the Earth's biocapacity by nearly 67%. In other words, our planet would need about 19 months to regenerate the renewable resources that mankind uses in 12 months¹ (Global Footprint Network National Footprint Accounts 2017 Edition).

But what is the situation for the Mediterranean region? Ecological Footprint Account-

ing shows that the entire region is running an ecological deficit: Mediterranean countries today demand approximately 2.5 times more natural resources and ecological services than the region's ecosystems can provide.

From 1961 to 2013, the Mediterranean's per person Ecological Footprint increased by 50%, while per person biocapacity in the region decreased by 16%. As of 2013, an average Mediterranean resident had an Ecological Footprint of 3.3 global hectares (gha), more than double the 1.2 gha of biocapacity available per person in the region. In approximately 50 years, the growing gap in supply and demand created a more than three-fold increase in the region's ecological deficit (GFN, 2015). As of 2013, the latest year for which results are currently available, the five Mediterranean countries with the highest per capita Footprints were Israel (6.0 gha), France (5.1 gha), Slovenia (4.7 gha), Italy (4.5 gha) and Malta (4.5 gha); at the lower end of the scale, the countries with the smallest per capita Ecological Footprint were Palestine (0.6 gha), Syria (1.4 gha), Morocco (1.7 gha), Egypt (2.0 gha) and Jordan (2.1 gha).

Drivers of the Mediterranean Footprint: Food and Transportation

According to latest analysis (GFN, 2015; Galli et al., 2017), the two components making up the largest share of the Mediterranean Ecological Footprint are food (28%) and transportation (22%). Targeting these areas through sustainable policies thus can offer the opportunity to have the greatest impact on the Ecological Footprint reduction of the region.

Food is a basic human requirement and its consumption heavily relates to dietary habits

1. Data and visuals on the Footprint and biocapacity over time of all world countries are available free at <http://data.footprintnetwork.org/>.

and production efficiency. Protein-intensive food (such as meat and dairy) requires more biological productive land (i.e. higher Footprint) to produce the same amount of calories as plant-based food products.

Despite differences in food consumption across Mediterranean countries, the overall reasons for the region's relatively high food Footprint include water scarcity, low agricultural productivity, growing dependence on imported food, and a transition away from the traditional, healthy and environment-friendly Mediterranean diet. Instead of consuming cereals, vegetables and oil typical of the Mediterranean diet, which has a low Footprint, countries are increasingly consuming meat and dairy as well as precooked meals. Portugal, Malta and Greece have been found to have the highest food Footprints in the region due to their protein-intensive diets (high food consumption, mostly from the fish sector, of the higher trophic levels and, when lacking locally, from increased imports). Conversely, Slovenia, Egypt and Israel have been found to have the lowest food Footprints as their diet includes bigger shares of cereals and vegetables (Galli et al., 2017). A recent study by Galli et al. (2017) has shown that shifting to calorie-adequate diets or changes in consumers' dietary preferences (towards less meat and more cereals and vegetables) could result in an 8%-10% reduction in the ecological deficit of the Mediterranean region. Agricultural productivity improvements, food waste reduction, and the promotion of healthier and less protein-based diets, all represent Footprint reduction opportunities for the region.

Transportation is the second largest driver of the Mediterranean region's Ecological Footprint. This component is mostly due to personal transportation in major cities of the Mediterranean, and it includes private vehicles and public transport. The transport sector represents on average 14% of the total Ecological Footprint in cities with lower per capita Ecological Foot-

print values (e.g. Cairo, Tunis and Tirana) and nearly 25% in cities with the largest Footprints (e.g. Athens, Rome and Barcelona) (Baabou et al., 2017).

Unlike food, transport is not a basic need and strongly depends on public services and national or municipal policies as well as personal behaviour. A well functioning public transport network can help to reduce resource requirements (mostly carbon Footprint) for transport services as it enables households to depend less on private cars (Baabou et al., 2017).

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Analysing Mediterranean cities' Footprint, Baabou et al. (2017) also found that cities with higher income levels show higher Ecological Footprint values due to heavier demand for energy-intensive goods and greater use of transportation. As a consequence, several major urban centres in the Mediterranean area (for instance Tel Aviv, Athens and Barcelona) have a larger per capita Ecological Footprint than the respective countries where they are located. These findings reveal two conflicting dynamics taking place in Mediterranean cities. On the one hand, cities, through their compactness, concentrate investments and maximise resources and energy efficiency, thus contributing to smaller per capita Footprints. On the other hand, cities also function as a "social elevator," enabling residents to upgrade their lifestyle and therefore increase their consumption level. Understanding the trade-offs between these two dynamics can help cities to better manage the interaction between nature and society and knowledgeably balance the human develop-

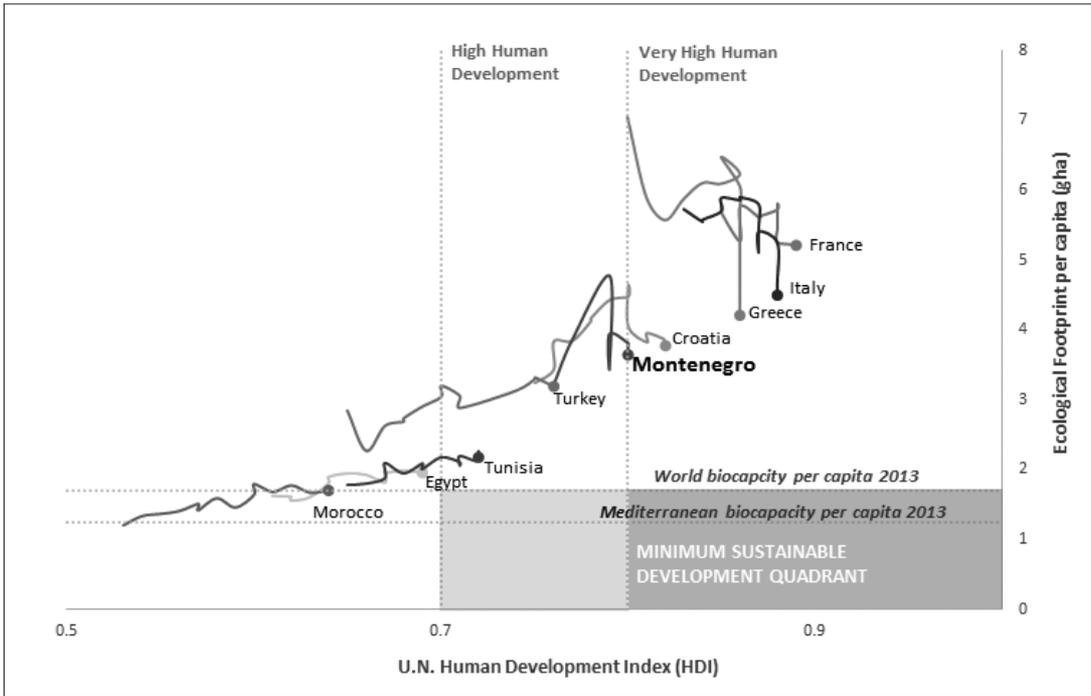


Chart 1: Mediterranean Countries, Ecological Footprint and HDI, 2000–2013.

ment needs with the planet’s environmental limits (GFN, 2015; Baabou et al., 2017; Galli et al., 2016).

The Case of Montenegro

Montenegro is one of the 22 UN member countries that voluntarily conducted a revision of its National Strategy for Sustainable Development (NSSD) – originally adopted in 2007 – with the aim of transposing the Agenda 2030 at the national level, and achieving its goal of becoming an ecological state. Montenegro adopted its revised NSSD until 2030 in June 2016 after completing several steps, including expert baseline assessments and public consultations. Furthermore, additional expert analyses were requested by the Montenegro Ministry of Sustainable Development and Tourism to develop an *Integrated NSSD Monitoring and Reporting*

Framework and provide a more complete and comprehensive monitoring of the sustainability of national development. Ecological Footprint Accounting was one of these extra analyses as the Global Footprint Network was tasked by the Ministry to conduct a Footprint assessment of the environmental impact of the different sectors of the Montenegrin economy and determine how feasible reductions in resource intensity may contribute to achieving the goals of the country’s NSSD until 2030.

Based on the Global Footprint Network Report (Grunewald et al., 2015), results of the Ecological Footprint analysis showed that, similar to other countries in the Mediterranean region, Montenegro is in a state of ecological deficit with a per capita Ecological Footprint exceeding its per capita biocapacity by 16% (3.6 gha vs 3.1 gha, respectively, in 2013). Unlike other countries, however, the Ecological Footprint and biocapacity of an average resident of

Montenegro are higher than average Mediterranean per capita values. Montenegro's higher per capita Ecological Footprint is likely due to the country's recent economic improvement, leading to higher consumption patterns, since its establishment as an independent Republic in 2006. Conversely, the higher per capita biocapacity is due to the natural endowment of Montenegro (mostly forest ecosystems covering up to 40% of the territory) coupled with a low population density.

The government of Montenegro decided to include the Ecological Footprint as one of the official indicators within the NSSD until 2030 monitoring framework, thus confirming the role of this indicator as a macro-level monitoring tool for wider sustainability progress

An analysis of consumption categories showed that household consumption makes up the greatest portion of Montenegro's Ecological Footprint, at about 75% of the total Footprint. Meanwhile, 19% of the total is demanded for gross fixed capital formation (new buildings, social infrastructures and factories), while the remaining 6% is covered by the government resources for public services (education and health) and defence.

A further analysis of the Montenegro Ecological Footprint identified the main drivers of the national resources demand. In line with overall results of the entire Mediterranean region, food and non-alcoholic beverages represent the biggest share of individual consumption categories, followed by resource requirements for transportation and housing. As such, policies targeting these two consumption-to-production chains should be prioritised as a first step towards sustainability.

Finally, the assessment of the Ecological Footprint-HDI framework for Montenegro over the period 2006-2013 found that the

country has experienced a minor increase in HDI (+3%), at the expense of a noticeable increase in the per capita Ecological Footprint (+30%). Since small increases in HDI seem to be continuously obtained at the cost of far larger increases in the Ecological Footprint, this could signal a huge potential for a more resource-efficient development in Montenegro.

As a result of these analyses and outputs, the Government of Montenegro decided to include the Ecological Footprint as one of the official indicators within the NSSD until 2030 monitoring framework, thus confirming the role of this indicator as a macro-level monitoring tool for wider sustainability progress. Two roles are foreseen for Ecological Footprint Accounting within Montenegro's NSSD monitoring system. On the one hand, it enables assessment of the current situation of resource demand (by the Montenegrin economy) and supply (by the Montenegrin ecosystems) as well as the historical evolution of these parameters. On the other, it can provide, in combination with the information derived from the UNDP's Human Development Index (HDI), a wider view of sustainability by assessing Montenegro's progress towards minimum conditions for sustainable human development: *living well* (measured with the UN HDI), *within the limits of the planet* (measured with Ecological Footprint Accounting).

Conclusions

Over the last decade, HDI has increased across the Mediterranean basin at the cost of growing ecological deficits region-wide, so highlighting a higher weight to "development" (i.e. higher income) than "sustainability" (i.e. the natural means of the planet). This reinforces the view that development is still mostly conceived as a resource-intensive journey with welfare being fuelled by resource extraction at ever increasing

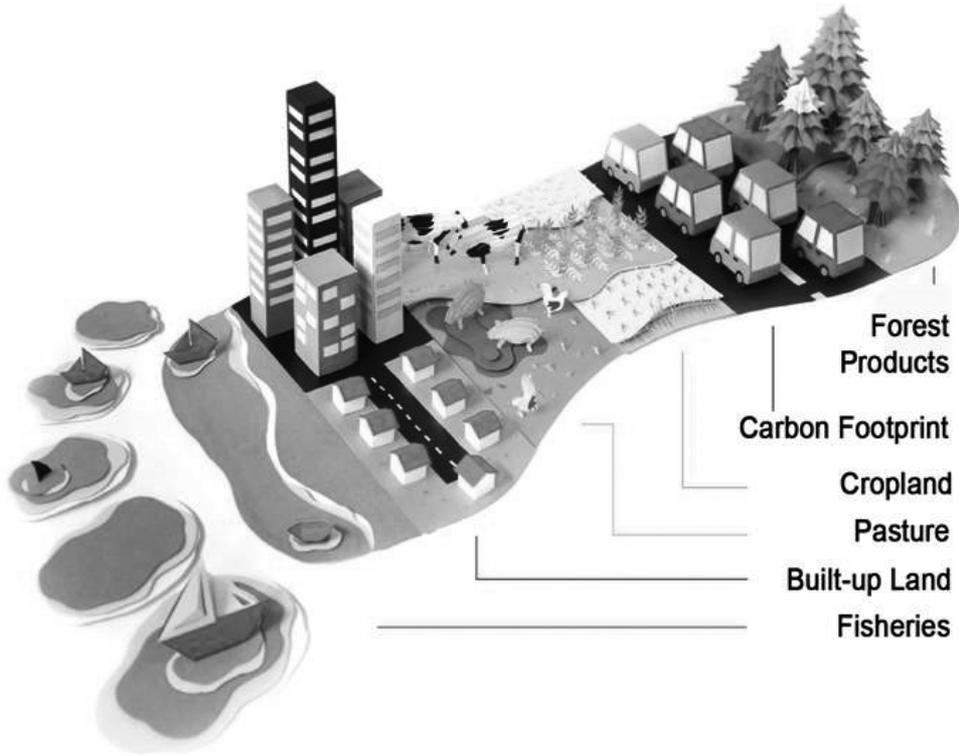


Figure 1: The Components of Ecological Footprint.

scales (Moran et al., 2008). However, as a growing population and climate change increase pressure on natural resources, decreasing overall resource demand is crucial for being able to continue to fuel development achievements (Wackernagel et al., 2017).

The process of revising Montenegro’s NSSD exemplifies an integrated approach to environmental and development planning and demonstrates the role of an indicator like the Ecological Footprint. Ecological Footprint Accounting can serve as a valuable tool to support national policy development as it enables a wider view of sustainability. It can also highlight to societies and leaders the finite supply of global resources, including ecosystem’s services (see also Galli, 2015). Moreover, while the Ecological Footprint can help identify areas

of potential intervention (Footprint hotspots) and set goals, it must be complemented with issue-specific indicators in the development and implementation of policies to monitor progress.

Bringing about sustainable development in the Mediterranean region is daunting but not impossible. While we still have far to go, measuring the basic conditions of sustainable development (well-being and living within nature’s means) can certainly help us navigate our path.

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