

DestiMED Project

Mediterranean Ecotourism Destination: main components (joint planning, monitoring, management and promotion) for a governance system in Mediterranean protected areas

WP3/Deliv. 3.2.3: Set of sustainability benchmarks for DestiMED destinations: Ecological Footprint assessment of pilot packages following 2 tests.

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DestiMED Project Partners:



(lead partner)

The Ecological Footprint of DestiMED ecotourism pilot packages: analysis, comparison and recommendations following test #2 (autumn 2018 - spring 2019)

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1. Foreword

This document provides analyses, comparison and recommendations for all the Protected Areas (PAs) based on the Ecological Footprint (EF) assessment of the ecotourism packages, after the completion of their second round of tests. Please note that, this document does not include any recommendations based on the Quality Assessment, which is provided separately by the DestiMED partnership.

As such, the two set of information – (1) EF assessment and recommendations and (2) Quality Assessment – should be taken into consideration jointly as criteria for developing/finalizing the program of ecotourism packages.

2. Introduction

This document focuses on Ecological Footprint analysis and presents the complete and updated set of results for Test #1 (occurred in 2017-2018) of all the 13 ecotourism packages, as well as complete results of Test #2 for all the 13 ecotourism packages, that have occurred in 2018-2019.

Test #2 results are compared and discussed in light of the Footprint assessments and recommendations provided at the conclusion of Test #1, and the consequent changes implemented in Test #2 by each Local Ecotourism Cluster (LEC).

This analysis is developed to help LECs to ensure the best quality of their ecotourism packages with minimum impact on the environment, with the objective of bringing the packages they have conceived towards the commercialization phase.

The document is organized into the following sections:

- Section 3: description of the methodological improvements that were implemented since Round 1;
- Section 4: information on how to read Footprint results;
- Section 5: Ecological Footprint results, which are presented and organized in the following subsections:
 - Section 5.1: new complete results of Round 1, thus constituting the benchmarks for Round 2;
 - Section 5.2: overview of results of Round 1 and Round 2 for all packages of DestiMED Project;
 - Section 5.3: introduction to detailed results of all PAs and Table 1 showing data gaps and fixes
- Annex 1: specific annex for each PA with a detailed Footprint analysis of Round of test #1 vs. Round of test #2 and final recommendations.

In analysing the results of Test #1 (Section 5.1), it is important to acknowledge that some values might be slightly different from those communicated during the first phase of recommendations (February 2018), as some improvements in the calculation method were necessary (see Section 3.1).

Such improvements are an integral part of the DestiMED project in which for the first time Ecological Footprint methodology is being applied to ecotourism products in Protected Areas, while also being tested for best implementation.

DestiMED is a testing type of project and the use of the Ecological Footprint as a system to monitor the environmental sustainability of packages is being tested as well.

Also, please note that since some of the LECs have modified the length of their package between Test #1 and Test #2, PA-specific analyses are presented here with values reported in “gha per capita per day” to allow comparison (see Section 5.2 onwards).

Finally, Table 1 provides a summary of all the acronyms used in this document and their meaning:

ACRONYM	FULL WORDING	MEANING/DEFINITION
EF	Ecological Footprint	Environmental accounting tool that measures the human appropriation of the regenerative capacity of the biosphere. The standard methodology has been customized to be applied within DestiMED project to monitor the environmental pressure—in terms of resources use—of each ecotourism product
GFN	Global Footprint Network	The NGO working on Ecological Footprint standards, research and applications. In collaboration with IUCN, GFN is conducting the Ecological Footprint assessment of the ecotourism packages in DestiMED.
gha	Global hectares	Unit of measure of the EF referring to hectare-equivalent units of land with world-average biological productivity
ITO(s)	Inbound Tour Operator(s)	Tourist agency(ies) that work in the DestiMED pilot territories and are located in and around the Protected Areas
LEC	Local Ecotourism Cluster	Local stakeholders (PA management officials, ITOs, and local service providers) of the DestiMED project who are responsible for sharing and promoting project results and outcome at local scale
PA(s)	Protected Area(s)	Geographical spaces, recognized and managed through legal means, that work towards long term conservation objectives for nature and the associated ecosystem services and cultural values

3. Methodology Improvements: changes in method and input data

The main objective of DestiMED is to develop ecotourism products through a participatory process that involves Protected Areas and local stakeholders, and to monitor the sustainability of such products. The Ecological Footprint indicator, developed by Global Footprint Network, is the methodology deployed to monitor the environmental pressure in terms of resource consumption of the packages. Traditional Ecological Footprint accounting (Borucke et al., 2013; Lin et al., 2018) has been customized for specific application to DestiMED ecotourism products, by using a bottom-up approach relying on questionnaires to collect on-the-ground data on the services provided to tourists. The aim of such analysis is to quantify the amount of land necessary to support all the services (i.e., *Accommodation, Food & Drinks, Mobility & Transfers, Activities & Services*) that tourists experience as a result of participating in the ecotourism packages developed by each PA. Details of the specific methodology are described in the report “Methodology for Ecological Footprint assessment of DestiMED ecotourism products - Deliverable 1 for DestiMED project”, as well as in Mancini et al., 2018¹.

This section describes the minor changes implemented in the calculation workbook, which were made necessary by the calibration of the method that followed the analysis of the first round of tests for the 13 PAs as well as the second round for the above mentioned 9 PAs. Round 2 was also used to verify input data from Round 1 and adjust them accordingly, when necessary.

¹ Mancini, M., Evans, M., Iha, K., Danelutti, C., & Galli, A. (2018). Assessing the Ecological Footprint of ecotourism packages: A methodological proposition. *Resources*, 7(2), 38.

3.1. Fall 2017 vs. Spring 2018 tests: modifications to the DestiMED workbook

The distributed timing of Test #1 turned out to be an advantage for fine-tuning the DestiMED Footprint approach, as it offered the opportunity for Global Footprint Network's staff to calibrate and revise the calculation workbook in between the two periods of testing. The main modifications implemented include:

- Accommodation:
 - For those PAs having accommodations located in places where the energy system is provided through a local grid (i.e. on islands), the approach and equations to calculate the EF of electricity consumption was revised to account for the specific local grid (i.e. diesel- or hydro-operated generator). This was necessary to capture the situation of Albania North and Menorca.
 - The labor Footprint² calculation was modified to capture the different hour commitment of workers depending on the accommodation type. In the first iteration of the calculation, each worker was considered to spend 8 hours a day in support of tourists irrespective of the type of accommodation. It is now assumed that actual 8 hours per worker are dedicated to tourists solely in hotel and resort accommodation types; 24 hours per day are dedicated to tourists (per each worker) on sailing boats; and 2 hours per day are dedicated by each worker to the tourists in all other accommodation types (e.g., B&Bs, apartment rentals, etc.).
- Food & Drinks:
 - Regarding the origin of food products, a fourth category - "on farm (0 km)" - was added in addition to "local", "national" and "international". This was done to take into account those restaurants producing their own food, for which no transportation of foodstuff is needed. Also, the "local" origin has been redefined as being up to 60 km distance of transportation (in round 1, it was assumed 1 km).
 - In terms of products' production mode, "non organic" has been preferred as wording to "conventional" after conversation with PAs representatives. This changed did not imply any change in the calculation method.
 - Acknowledging that information regarding *origin* or *mode of production* is very specific and not always easily available, a default assumption has been implemented, which classifies food items as "national" and "non-organic" when surveys are missing information on origin and mode of production.
 - As for seafood products, low resolution in capturing the Footprint of all the fish species provided in the meals of DestiMED packages is acknowledged. This is due, in turn, to the low resolution of the fish Footprint intensity data coming from the National Footprint Accounts³, in which the coarse grouping of species and the use of a top-down approach do not allow to capture minor to moderate differences in specific fish species. Consequently, those fish species not included in calculations have been grouped with the existing ones by matching the proximity of both species' trophic level and Footprint intensities.
- Mobility & Transfers:

² Labor Footprint refers to the Ecological Footprint of each worker employed in the package and needed to provide the specific service. The EF of human labor derives from the amount of resources needed for each worker to properly perform his/her job.

³ See National Footprint Account 2017 edition. and the guidebook to it: D. Lin, L. Hanscom, J. Martindill, M. Borucke, L. Cohen, A. Galli, E. Lazarus, G. Zokai, K. Iha, D. Eaton, M. Wackernagel. 2017. *Working Guidebook to the National Footprint Accounts*. Oakland: Global Footprint Network.

- Ranges of fuel efficiency have been revised for all PAs to ensure they were communicated in km/L as requested in the survey, rather than in L/100 km as more commonly provided in the specifics of vehicles.

Altogether the above modifications have caused minor changes in the EF results of packages already analyzed in 2017 and have thus led to the new benchmark values for all the 13 PAs that are presented in this report (see Section 5.1).

4. How to read and interpret Ecological Footprint results

For each PA, results can be provided and visualized in multiple ways, each one providing different information, as summarized below:

- **Ecological Footprint of the whole ecotourism package:** for each package, this result measures the overall Footprint impact of the entire ecotourism package, given a specific number of tourists and a specific duration. Since there is a significant variation among packages in the number of tourists, duration, type of facilities and meals served, as well as activities and plans conducted, this breakdown should not be used for comparison among PAs. Moreover, for those PAs that have modified the length of their package and/or the number of tourists hosted, this result's breakdown should not be used for comparing different rounds of test;
- **Ecological Footprint per capita per day:** for each package, this result measures the Footprint impact caused by each single tourist during one full day, and thus allows for comparisons across PAs as well as between the two rounds of testing for the same PA. This measure is used for understanding the general trends and identifying best cases and practices among all the PAs. However, this measure does not provide an assessment of the overall impact caused by each entire package in its full length.

To sum up, the Ecological Footprint values of ecotourism packages expressed in *gha per package* can be used to understand the total resource demand of the product and is useful information for Protected Area (PA) managers and Inbound Tour Operators (ITOs), as well as for the network at large, to understand the overall environmental pressure generated by tourists purchasing their packages. However, as already mentioned in the introduction, results from Section 5.2 onwards are solely provided in this report in terms of *gha per capita per day* to allow for the comparison of packages in between the two testing rounds.

Both of the above results can then be broken down by activities or by land types thus providing different information:

- **Ecological Footprint by activity:** this breakdown looks at how the total Footprint spans across all of the various activities offered in the package. Four main activity categories are considered, which are *Accommodation* (i.e. hosting facilities where the tourists stay), *Food & Drinks* (all meals offered to tourists – e.g., breakfasts, lunches, dinners, wine tastings, etc.), *Activities & Services* (i.e. tours, excursions, recreational and other type of activities) and *Mobility & Transfers* (i.e. transportation used to move tourists from one place to another).
- **Ecological Footprint by land type:** this breakdown looks at the land types upon which Footprint pressures are placed, considering the six bio-productive land types of the methodology (i.e. cropland, grazing land, fishing ground, forest land, built-up land and land for carbon uptake). It helps identify how many natural resources are needed to support the entire package offer and provides insight on the ecosystems that are in highest demand due to the tourists' activities.

To sum up, ecotourism package results broken down by activities are useful for PAs to understand to what extent each activity contributes to the package's total Footprint and help them identify where to eventually intervene to lower the Footprint of the product they offer. Results by land types inform PAs on which ecosystems are most impacted by the packages they have designed and implemented.

5. Results

This section first shows the amended and complete Ecological Footprint results for all PAs in Test #1 to define Footprint values of all ecotourism packages, which will be used as benchmarks for future comparisons. Subsequently, Ecological Footprint results for the second round of tests are provided for those PAs that conducted the second test in Spring 2018 (Colline Metallifere, Torre del Cerrano, Samaria, Delta del Ebro and Lastovo), Fall 2018 (Calanques, Camargue, Kornati and Menorca) and Spring 2019 (Circeo, Ulysses Riviera, Albania North and Albania South). Finally, a specific Annex for each PA provides analytical comparison of the EF results for Test #1 and Test #2, with details on the four categories of activity.

5.1. Ecological Footprint benchmarks: new complete results for Round of test #1

The Ecological Footprint assessment of the first round of tests for the 13 PAs involved in the project was conducted between Fall 2017 and Spring 2018, according to the timing of each test. After the calculation fine-tuning described in Section 3.1 of this report, Round 1 Footprint results show that the Ecological Footprint of an average ecotourism package defined in the framework of DestiMED is approximately **0.53 global hectares** (gha) per package, with values ranging from as low as 0.29 gha (45% lower than the average) to 0.74 gha (39% higher than the average) per package (see Figure 1).

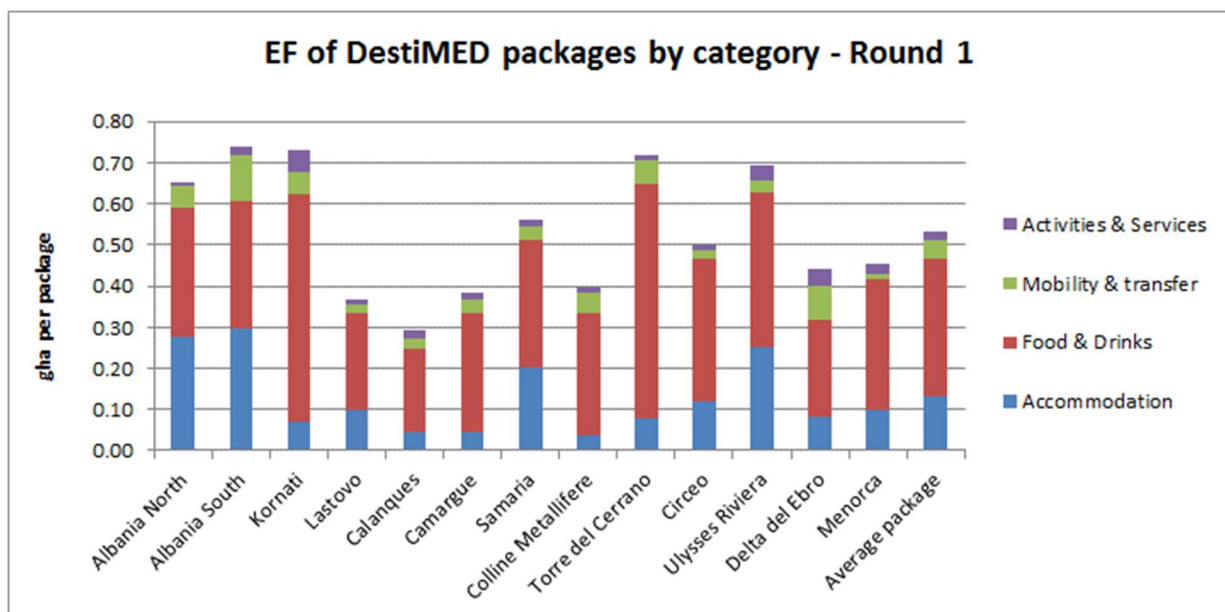


Figure 1: Ecological Footprint results for the 13 ecotourism packages. Results are given in global hectares per package and broken down by activity. The average package Footprint is also reported (right-end column).

Although each package had different Footprint values, some similarities can be identified within the drivers behind those values. Among the four categories of consumption analysed, **Food & Drinks** was found to represent the highest share of the total Ecological Footprint in all 13 packages; **Accommodation** was found to constitute the second highest share in all but 2 packages, for which **Mobility & Transfers** was found to have the second highest contribution. **Activities & Services** was always the lowest share of the package's Footprint. Details for each category are provided as follows:

- **Food & Drinks** is the primary driver of the EF for all packages and it represents 63% of the total Footprint value of the average package. High Footprint values for *Food & Drinks* were found in those packages serving high amounts of fish and meat products⁴, since protein-based diets have a higher embedded Ecological Footprint compared to cereal and vegetable-rich diets as highlighted in previous studies⁵. At the same time, lower Footprint values were found in those packages opting for unpackaged, on-farm and/or local food products, as well as for animal-protein-free light and quick lunches (e.g., picnic as a type of quick lunch) provided to tourists as part of activities (e.g., hiking). Moreover, according to the testers' responses to the DestiMED Quality Survey - to whom some specific questions on food typology and quantities were asked as an additional validation of the responses of the service providers - the quantities of food served in the majority of packages (9 out of 13) was found to be too much. Finally, our analysis found that although most packages offered primarily local or national food, only few packages favoured organic products.
- **Accommodation represents the second highest Footprint share on average** (25% of the total) although it is nearly as relevant as Food in one package (Albania South). The packages with the highest Footprint value for this category are those that made use of conventional facilities (i.e. hotel-type). Although they benefit from an economy of scale given the high number of tourists they can host, hotels and resorts usually have a larger building surface, a higher number of employees fully dedicated to tourists, and require high energy/electricity consumption to run the entire facility. Additionally, they hardly meet the criteria of being local and "authentic" and supporting local communities, which the DestiMED standard requires. Agritourism and green, small-scale or traditional facilities - possibly making use of renewable alternative energy systems - were found among the accommodations with the lowest Footprint value, also due to a lower labour Footprint (See Section 3.1). These options support the project criteria of choosing small family-run facilities, which are more "authentic" and in line with the local context and meet both environmental and socio-economic criteria. Nonetheless, a few cases were detected in which small-scale facilities (e.g., apartment renting) have high Footprint values, mostly due to the low number of tourists accommodated per year and low energy efficiency. Also, packages making use of big hotel-type facilities might sometimes have a low accommodation Footprint due to an economy of scale in energy consumption. These factors highlight the complexity of the relationship between environmental and socio-economic aspects of tourism sustainability, at least when it comes to accommodation.
- **Mobility & Transfers comes as the third most impactful category** with an average of 8% of the total Footprint and a maximum share ranging between 12% and 19% of the total in 3 out of 13 packages. For 2 of these 3 packages, *Mobility & Transfers* constitutes the second most impactful category (Delta del Ebro and Colline Metallifere). The highest values for this category were found in packages that include long transfers to and from the closest airport (or harbour) – which are usually more than 100 km away from the PA – that had tourists arrive at different times thus requiring multiple pick-ups, or that needed more than one vehicle for the daily transfer of tourists due to the group size. In the majority of the packages, we found such transfers to be organized with diesel-operated private motor vehicles (car or van), which fit primarily in the fuel efficiency range of "10 to 15" km per litre. The Footprint impacts of daily transfers to and from activities/hotels were found negligible in most cases.

⁴ A refinement in the analysis through a bottom-up investigation of the Footprint of fish species would be needed to increase the resolution of the fish-based Footprint assessment of DestiMED packages (see also Section 3.1).

⁵ See for instance Galli et al., 2017. Mediterranean countries' food consumption and sourcing patterns: An Ecological Footprint viewpoint. *Science of the Total Environment*, 578, 383–391.

- **Activities & Services has the lowest impact** with an average contribution of only 4% of the total Footprint value (ranging from 1% to 9%). In general, the drivers assessed for this category are the use of motor vehicles (as it implies the release of CO₂ emissions) and the “labour Footprint”, which is the Footprint associated with the employees involved in guiding or assisting the tourist group throughout all the activities (e.g., tour guides, tour leaders, managers of the activities, boat drivers, bird watching guides, etc.). In 5 out of 13 packages, there was no activity involving motor vehicles.

While the information reported in Figure 1 allows for the identification and analysis of general trends, it cannot be used to compare results across packages - or same packages over different rounds of test - as they differ in both the number of tourists they are designed for and their duration (from a minimum of 3 nights and 4 days to a maximum of 6 nights and 7 days).

To overcome these differences and thus be able to compare across packages, **Ecological Footprint results per tourist per day** are provided in Figure 2.

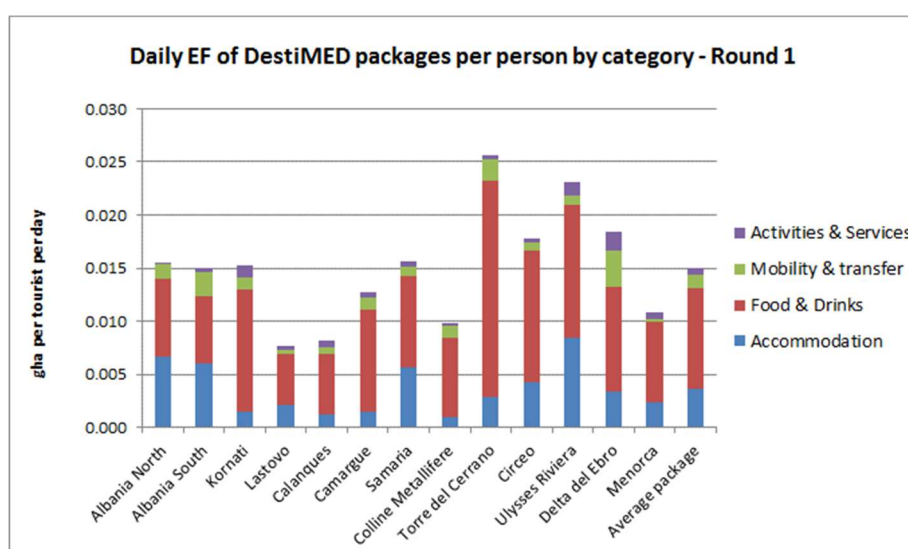


Figure 2: Ecological Footprint per tourist per day for the 13 packages. Footprints per day have been calculated by dividing the total package EF by the number of days each package lasted. In this way all the packages are comparable.

Figure 2 results can be used to draw a ranking from the package with the lowest Footprint value to that with the highest value, as well as to discuss best practices. Based on this, LECs across the PAs might want to meet and exchange considerations and opinions on how to reach the lowest positions and thus decrease their impact on natural resource consumption.

5.2. Ecological Footprint comparison: Test #1 vs. Test #2

Ecological Footprint results of Round of test #2 and comparison with Round of test #1 are shown in Figure 3. Depending on the different timing and needs of each PA, Round 2 was run in Spring 2018, Fall 2018 and Spring 2019.

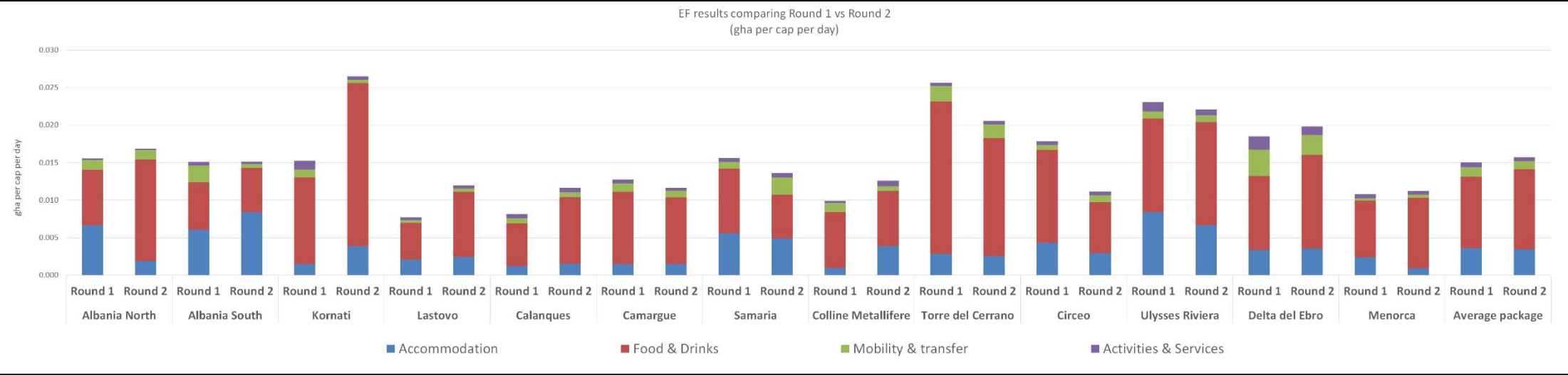


Figure 3: Daily Ecological Footprint per capita values of 13 ecotourism packages comparing Round 1 vs. Round 2. The last two columns show the Footprint value of the average package

DestiMED ecotourism packages increased their Footprint values by an average of 5% in Round 2, being 0.016 gha per capita per day vs. 0.015 gha per cap per day in Round 1. In fact, 8 out of 13 ecotourism packages increased their Footprint value in Round 2, with increases ranging from +1% (Albania South) to +74% (Kornati) greater than Round 1. On the contrary, 5 out of 9 packages decreased their Footprint value in Round 2, with reductions ranging from -4% (Camargue) to -37% (Circeo).

On average, the only component increasing its daily Footprint per capita in Round 2 was *Food & Drink*, increasing by 12%. In general, this is due to greater quantities of food served as well as a higher share of fish products provided in Round 2, despite the recommendations provided. On the contrary, *Accommodation* category decreased on average by 4%, while Footprint values of *Mobility & Transfers* and *Activity & Service* decreased both by 16%, thanks to shorter distances covered by motor vehicles and more options for public transportation or alternative vehicles (i.e. mostly bikes) in transfers, as well as reduced number of motor vehicles used during activities.

Detailed analysis of each category will be given in Annex 1 for each PA.

5.3. Specific EF results of Round 1 and Round 2 and final recommendations

The following Annexes provide EF results (expressed in gha per tourist per day) for those Protected Areas that have already completed both rounds of tests for their packages⁶. For each PA, results are analyzed and discussed in light of the recommendations for Ecological Footprint improvement sent to PA representatives after the first round of tests and those actually implemented as indicated by PA representatives.

Please note that EF calculations and results are based on data collected on the ground through EF surveys by the representatives of each LEC and then communicated to GFN. As such, despite a Q&A process was implemented, the quality of EF results strongly depends on the reliability, completeness and quality of the data received. See Table 1 for an overview of data quality and gaps in each PA.

Finally, it is worth repeating that these results and recommendations are specific to the Ecological Footprint evaluation solely and thus have to be considered by the LEC and the providers alongside with the Quality Assessment plan, which includes an evaluation of the coherence, quality and distribution of all the activities offered in each package.

⁶ Results are based on the DestiMED workbook dated 19 March 2019.

Table 1: Data gaps and fixes in Test #1 and Test #2

Pas	Test 1					Test 2				
	Accommodation	Food & Drink	Mobility & Transfer	Activity & Service	Data fix R1	Accommodation	Food & Drink	Mobility & Transfer	Activity & Service	Data fix R2
Albania North	No data gaps	Missing entire dataset for breakfast Day 6	No data gaps	No data gaps		Some mismatching data with Round 1 for same facilities	No data gaps	No data gaps	No data gaps	
Albania South	No data gaps	No data gaps	No data gaps	No data gaps		Data for Hotel Sofo copied from Round 1	No data gaps	No data gaps	No data gaps	
Kornati	No data gaps	Missing or unreliable data on quantities for few items in day 2 (lunch and breakfast)	No data gaps	No data gaps		Missing electricity consumption missing in 2 accommodations (Skracic and Old Town Sibenik)	No data gaps	No data gaps	No data gaps	
Lastovo	No data gaps	Missing entire dataset for Day 1 dinner day 1 and breakfast day 2	No data gaps	No data gaps		Electricity consumption missing in the apartment renting and most data missing for hotel in Split	No data gaps	Missing data on transfer via ferry boat	No data gaps	ACCOMMODATION: Data for hotel in Split copied from R1 MOBILITY: data on transfer via ferry boat copied from R1
Calanques	Missing data for heating and hot water consumption in 1 Accom (La Fontasse)	No data gaps	No data gaps	No data gaps		Missing data for heating and hot water consumption in 1 accomm (La Fontasse)	No data gaps	No data gaps	No data gaps	
Camargue	No data gaps	No data gaps	No data gaps	No data gaps		No data gaps	No data gaps	No data gaps	No data gaps	
Samaria	Missing entire dataset for 1 accomm (hotel Kriti)	No data gaps	No data gaps	No data gaps		Missing energy consumption data in one facility (Porto Veneziano)	No data gaps	No data gaps	Missing data for 1 motor vehicle (boat following the kayaks)	
Colline Metallifere	No data gaps	No data gaps	No data gaps	No data gaps		No data gaps	No data gaps	No data gaps	No data gaps	
Torre del Cerrano	No data gaps	No data gaps	No data gaps	No data gaps		No data gaps	No data gaps	No data gaps	No data gaps	
Circeo	No data gaps	No data gaps	No data gaps	No data gaps		No data gaps	No data gaps	No data gaps	No data gaps	
Ulysses Riviera	Missing whole dataset for 2 accommodations	Missing data on mode of production for all food items	No data gaps	No data gaps	FOOD: mode of production of all food items assumed to be "conventional"	No data gaps	No data gaps	No data gaps	No data gaps	

Table 1: continued

Pas	Test 1					Test 2				
	Accommodation	Food & Drink	Mobility & Transfer	Activity & Service	Data fix R1	Accommodation	Food & Drink	Mobility & Transfer	Activity & Service	Data fix R2
Delta del Ebro	Missing data on electricity consumption in the accommodation	No data gaps	No data gaps	No data gaps	ACCOMMODATION: Data on electricity consumption has been estimated assuming different usage of appliances during the day	Missing data on electricity consumption in the accommodation	Missing entire dataset for Day 2 Breakfast	No data gaps	No data gaps	ACCOMMODATION: Data on electricity consumption copied from R1 FOOD: breakfast data estimated as the median of all other breakfast provided in that facility (surveyor confirmed it was equal to the breakfasts in the other days)
Menorca	Missing entire dataset for 1 hotel (Hotel Capri) Missing electricity consumption data and heating system data in one facility (CasaLadico)	Missing entire dataset for 5 meals Missing data on quantity of food in Day 2 Dinner and Day 3 Breakfast	Missing data on the transfers from and to the airport (day 1 and day 6)	No data gaps	FOOD: food quantities have been estimated upon conversations with the package testers.	No data gaps	Missing entire dataset for 2 meals (Day 4 dinner and Day 5 lunch)	No data gaps	No data gaps	