Measuring tourism pressure and its impact on destinations’ carrying capacity and sustainability

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Questions to address

- How do you define in Greece/the Observatory the destination carrying capacity?
- Which factors are you taking into account – physical, social, cultural, etc.?
- Where are the suggested limits? Based on which arguments these limits are defined?
- How does this relate to the discussions on “intensities” in tourism?
- Which measurement discussion you consider useful for this?
- Meaning: focus not so much on the how you measure, but which dimensions are considered, how you conclude the limits
- Role of stakeholders in this and impact on them
The role of stakeholders: Governance

Two levels of consideration:

Overtourism as the perception of locals (and tourists).

• Why? The comparison between Barcelona (1:10) and Santorini (10:1)
• How to address: use of surveys to record locals’ satisfaction (entrepreneurs, employees, people without direct implication in tourism)

What future the stakeholders want for their destination?
• The implication of locals in the whole procedure of planning:
  ➢ Understand the problems
  ➢ Calibrate the evaluation system of “limits”
  ➢ Participate in the decision-making process about the future of their area.
Definitions: the carrying capacity of a destination

• The **carrying capacity** of an environment is the maximum population size of a biological species that can be sustained by that specific environment, given the availability of food, habitat, water, and other resources.

• The carrying capacity is defined as the environment’s maximal load (ecological footprint) from the different human activities before ecosystems functions are not any more capable to produce ecosystem products and services.

• The notion of **minimum environmental capital** (i.e. habitat, fish) as capable and necessary condition for its reproduction.

• The approach of 4 capitals: environmental, human (incl. cultural), man-made (incl. technological) and social and their importance in the sustainability approach.
Sustainable Tourism

The World Tourism Organisation (WTO) defines sustainable tourism development as: “Development that meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems”. (WTO, 2001)

Within this definition UNWTO has include two things:

• **an activity that lasts** (satisfaction of tourists and locals from tourism now and in the future)

• **with in a destination that lasts** (economic, social, cultural, environmental aspects)

“Mandate” to scientists to **measure the tourism footprint** and evaluate if tourism - along with the other existing activities- contributes or not to the **sustainability of the destination**, which means within its’ carrying capacity limits.
Measuring Sustainable Development

Human welfare

Sustainable Development

Economic efficiency
- GDP
- Exporting & Competitive Sectors
- Avoidance of monoculture

Social justice
- Population change
- Active population
- Aged Population
- Unemployment
- Income
- Income distribution
- Life expectancy

Environmental Conservation
- Sea
- Drinking water
- Soil
- Biodiversity
- Landscape
- Air quality
- Quality of urban space

Society welfare

Environmental welfare
Sustainable Tourism in Sustainable Destinations

Tourism Activity and its contribution to the global sustainability
The methodological framework - DPSIR

Performance
Activity's Footprint
Direct effect

P

Effect to
Area's sustainability
Total effect

S

Impact
to future

I

Response
Policy

Tourism infrastructure & services

General infrastructure & services

Cultural services

Sports and recreational services

Environmental – Natural Assets

Cultural Assets

Development pattern

Tourism Receipts

Employment

Land use changes

Water, energy & other resources consumption

Solid and water waste production

Air, Noise, Light etc pollution

GDP

Population size & structure

Life expectancy

Unemployment & income distribution (poverty)

Drinking water availability & quality

Sea quality

Soil quality

Biodiversity

Air quality

Other resources quality and availability

Landscape quality

Urban quality

Capacity to provide economic welfare

Capacity to provide social welfare

Capacity to provide ecosystem goods & services
The tourism footprint: the results of tourism activity

The measurement of the tourism “intensities” and their role:

- **Tourism intensity**: tourists/population has to do with the pressure on people and the perception of overtourism

- **Tourism density** (tourists/km²) has more to do with the pressure on the environment – is an indication and has to be checked by data if there is causing problems or not. Necessary to add the pressures by the other activities and the local population in order to understand the role of each and plan the correct policy measures.

  Example about water:
  - Is there any water scarcity? Is abstraction higher than natural refilment?
  - Is the consumption per hectare, per night spent, per production unit, high?
What we measure: be ambitious and realistic. The Blue Plan project for 14 Mediterranean Destinations (2009-12)

<table>
<thead>
<tr>
<th>The “companies’ dashboard”</th>
<th>The “destinations’ dashboard or radar”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Indicators:</strong></td>
<td><strong>Basic Indicators:</strong></td>
</tr>
<tr>
<td>Econ 1: Nights spent per bed (clients per table, rented days of a bike/car, etc)</td>
<td>Econ 1: Nights spent per bed</td>
</tr>
<tr>
<td>Econ 2: Receipts per night spent (or per client)</td>
<td>Econ 2: Tourism expenditure (direct contribution of tourism GDP) per bed</td>
</tr>
<tr>
<td>Econ 3: Receipts per bed (or per m², per table, per rented car, etc.)</td>
<td>Econ 3: Total contribution of tourism GDP created per bed</td>
</tr>
<tr>
<td>Social 1: Employment per bed (or per m², per table, per rented car, etc.) – equivalent annual employment</td>
<td>Soc 1: Direct employment per bed (equivalent annual employment)</td>
</tr>
<tr>
<td>Env 1: Water consumption per night spent (or m²)</td>
<td>Soc 2: Total employment per bed (equivalent annual employment)</td>
</tr>
<tr>
<td>Env 2: Energy consumption per night spent (or m²)</td>
<td>Env 1: Average space occupied by tourists per bed</td>
</tr>
<tr>
<td>Environment 3: Waste production per night spent (or m²)</td>
<td>Env 2: Average water consumption by tourists per bed</td>
</tr>
<tr>
<td>Env 4: Space occupied (per bed, per table, per car, per berth place, etc)</td>
<td>Env 3: Average energy consumption by tourists per bed</td>
</tr>
<tr>
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<td>Env 4: Average waste production by tourists per bed</td>
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</tbody>
</table>

The INSTO project: issues but not list of variables/indicators

Main issue: To persuade policy-makers about the necessity of monitoring and management (DMMO): the 4 pillars of UNWTO/GSTC evaluation system

The difficulty to “impose” a unique system to destinations with different features and different statistical systems
Which content of an evaluation and policy system?

How to improve the tourism performance (sustainable tourism) for the welfare of destinations’ societies (sustainable destinations) with different partners and different goals?

• The goals of enterprises for profit maximization in short/mid term

• The goals of tourism partners (including employees and activities relayed to tourism) for continuous growth despite the “alterations” produced (i.e expansion of built/artificialized areas)

• The goals of destinations/host areas for long term development and quality of life (sustainable development)

Who is going to say that a performance of a company or a destination is unsustainable and to document it?
The need for goals and benchmarking for companies and destinations

WWF, 2005, Why environmental benchmarking will help your hotel

McKinsey, 2017, Coping with success, WTTC
Monitoring systems, trades-off and levels of sustainability

A need for overall evaluation of a system in order to prioritize policy measures
Tourism sustainability depends on both tourist behaviour and tourism development model (production and consumption pattern).

### Equivalent Population/Resident Population:
- Scoring Range Criteria: Greek Average

### Waste Production/Night:
- Scoring Range Criteria: Environmental Benchmarking (WWF, 2005)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Indicators</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Beds/Resident</strong></td>
<td>Total Beds/Resident</td>
<td>0 - 1.5 - 3 - 4.5 - 6</td>
</tr>
<tr>
<td><strong>Equivalent Pop/Resident Pop</strong></td>
<td>Equivalemt Pop/Resident Pop</td>
<td>0% - 25% - 50% - 75% - 100%</td>
</tr>
<tr>
<td><strong>Daily Cruise arrivals / Total Pop</strong></td>
<td>Daily Cruise arrivals / Total Pop</td>
<td>0% - 2% - 4% - 6% - 8%</td>
</tr>
<tr>
<td><strong>Daily Expenditure</strong></td>
<td>Daily Expenditure</td>
<td>200 - 150 - 100 - 50 - 0</td>
</tr>
<tr>
<td><strong>Hotel Occupancy Rate</strong></td>
<td>Hotel Occupancy Rate</td>
<td>100% - 75% - 50% - 25% - 0%</td>
</tr>
<tr>
<td><strong>Arrivals: Highest Trimester/ Total Year</strong></td>
<td>Arrivals: Highest Trimester/ Total Year</td>
<td>25% - 40% - 55% - 70% - 85%</td>
</tr>
<tr>
<td><strong>Hotel Turnover: Highest Trimester/ Total Year</strong></td>
<td>Hotel Turnover: Highest Trimester/ Total Year</td>
<td>25% - 40% - 55% - 70% - 85%</td>
</tr>
<tr>
<td><strong>Employment Hotels/Professional Beds</strong></td>
<td>Employment Hotels/Professional Beds</td>
<td>0.2 - 0.15 - 0.1 - 0.05 - 0.1</td>
</tr>
<tr>
<td><strong>Employment in Tourism/Total Tourism Beds</strong></td>
<td>Employment in Tourism/Total Tourism Beds</td>
<td>0.7 - 0.55 - 0.4 - 0.25 - 0.1</td>
</tr>
<tr>
<td><strong>Water Consumption/Night</strong></td>
<td>Water Consumption/Night</td>
<td>100 - 300 - 500 - 700 - 900</td>
</tr>
<tr>
<td><strong>Energy Consumption/Night</strong></td>
<td>Energy Consumption/Night</td>
<td>10 - 20 - 30 - 40 - 50</td>
</tr>
<tr>
<td><strong>Waste Production/Night</strong></td>
<td>Waste Production/Night</td>
<td>0.5 - 1 - 1.5 - 2 - 2.3</td>
</tr>
<tr>
<td><strong>Built Hotel Area/Hotel Bed</strong></td>
<td>Built Hotel Area/Hotel Bed</td>
<td></td>
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</table>

Tourism Sustainability Scoring Ranges

- Social Pressure
- Economic Efficiency
- Seasonality
- Employment
- Environmental Pressure
### Destination Sustainability

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<tr>
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<tbody>
<tr>
<td><strong>Economical</strong></td>
<td></td>
<td></td>
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<tr>
<td>Turnover: Tourism/Total</td>
<td>0% - 20% - 40% - 60% - 80%</td>
<td></td>
</tr>
<tr>
<td>Employment: Tourism/Total</td>
<td>0% - 20% - 40% - 60% - 80%</td>
<td></td>
</tr>
<tr>
<td><strong>Employment Seasonality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment: Census/Turnover Data</td>
<td>110% - 90% - 70% - 50% - 30%</td>
<td></td>
</tr>
<tr>
<td>Employment in Tourism: Census/Turnover Data</td>
<td>110% - 90% - 70% - 50% - 30%</td>
<td></td>
</tr>
<tr>
<td><strong>Social Pressure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Movement (Pop)</td>
<td>6 - 3 - 0 - -3 - -6</td>
<td></td>
</tr>
<tr>
<td>Population Growth</td>
<td>60% - 80% - 100% - 120% - 140%</td>
<td></td>
</tr>
<tr>
<td>Population Aging Indicator</td>
<td>50% - 75% - 100% - 125% - 150%</td>
<td></td>
</tr>
<tr>
<td>Active Pop/Total Pop</td>
<td>50% - 55% - 60% - 65% - 70%</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Pressure/km²</td>
<td>0 - 200 - 400 - 600 - 800</td>
<td></td>
</tr>
<tr>
<td>Built Shoreline %</td>
<td>0% - 10% - 20% - 30% - 40%</td>
<td></td>
</tr>
<tr>
<td>RES/Total Energy</td>
<td>80% - 60% - 40% - 20% - 0%</td>
<td></td>
</tr>
<tr>
<td>Noise Pollution</td>
<td>0 - 2,5 - 5 - 7,5 - 10</td>
<td></td>
</tr>
<tr>
<td>Built Area %</td>
<td>0% - 10% - 20% - 30% - 40%</td>
<td></td>
</tr>
<tr>
<td>Fragmentation Indicator</td>
<td>0 - 0,2 - 0,4 - 0,6 - 0,8</td>
<td></td>
</tr>
<tr>
<td>Desertification Vulnerability</td>
<td>0% - 15% - 30% - 45% - 60%</td>
<td></td>
</tr>
<tr>
<td>Water Consumption/Natural Water Supply</td>
<td>20% - 40% - 60% - 80% - 100%</td>
<td></td>
</tr>
<tr>
<td>Sea Water Quality</td>
<td>100% - 75% - 50% - 25% - 0%</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>0 - 50 - 100 - 150 - 200</td>
<td></td>
</tr>
</tbody>
</table>

### Social Pressure

- a. Total Beds/Resident
- b. Equivalent Pop/Resident Pop
- c. Daily Cruise arrivals / Total Pop

### Economic Efficiency

- d. Daily Expenditure
- e. Hotel Occupancy Rate

### Seasonality

- f. Arrivals: Highest Trimester/ Total Year
- g. Hotel Turnover: Highest Trimester/ Total Year
Economical
1. Turnover: Tourism/Total
2. Employment: Tourism/Total

Employment Seasonality
3. Employment: Census/Turnover Data
4. Employment in Tourism: Census/Turnover Data

Social Pressure
5. Natural Movement (Pop)
6. Population Growth
7. Population Aging Indicator
8. Active Pop/Total Pop
The MST project: parameters and indicators

• **Setting the parameters:** The finalisation of the MST Statistical Framework was a necessary first step, and it was not easy.

• **Setting the indicators:** the list of 29 indicators and the remarks done concerning mainly:
  - The need for separation between indicators of tourism performance and impact indicators to the state of the destination
  - The need to take into account the land use changes influencing many environmental parameters (water, biodiversity, air quality, soil) as:
    - Hotel built area/bed (P)
    - Total built area for tourism purposes/bed (P)
    - Fragmentation index
    - Desertification index
Thank you for your attention

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