

A proposal for integration between Life Cycle Assessment and other instruments and indicators as a way to promote Sustainable Production and Consumption strategies

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1. Introduction

The necessity of a more sustainable approach to production and consumption patterns has been widely highlighted by international resolutions and directives as a way to promote sustainable development in daily life activities (see, for instance, SDS e IPP). Furthermore, spatial planning processes need support by specific instruments for evaluation that are able to analyze long term effects of the defined policies. In this context, the Life Cycle Assessment of significant aspects of tourism (different kind of hospitality structures, tourist services, transportation) can integrate the methodology of other sustainability indicators, enabling to identify development scenarios and to define decision support systems for local administrators.

Within this context, Life Cycle Assessment represents a useful tool for the investigation of impacts and the identification of more sustainable solutions within the whole supply chain (from the choice of raw materials to the delivery services and recycle or waste processing). To address the goal of making people and organization more aware about the importance of their choice, a more communicative tool is needed, useful to visualize the impacts and compare them with the actual availability of assets. The present work defines an comprehensive conceptual model for the integration of detailed Life Cycle analysis of a specific supply chain - tourism sector - in the evaluation of the sustainability of consumption patterns performed with Ecological Footprint method. Final aim is to provide an instrument that enables to identify scenarios of development and to define decision support systems, to improve consciousness and responsibility of organizations that provide goods and services and of consumers.

2. Materials and methods

The choice of the model of development for tourism destination (e.g. the level of urbanization, the prevailing type of hospitality structure, the infrastructures and tourist facilities existing), affect the possibility for tourists to make more sustainable choices of consumption: for instance, if the number of beds in less impacting structures (as B&B and agritourism) is limited, then the number of tourists that spend their holiday in less sustainable type of accommodation will be necessarily higher; in the same way, if public transport is not efficient, then it would be difficult to make tourist leave their private car at home.

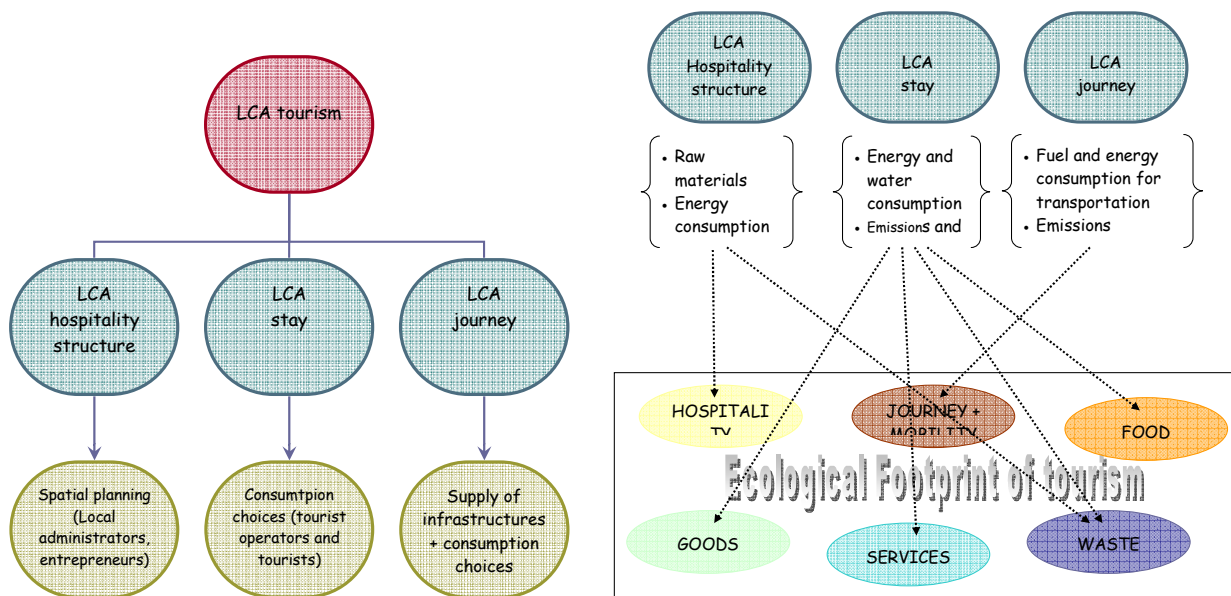
The application of LCA methodology to tourism sector highlights a question about the definition of the system which is the object of the evaluation: in the present study, for the definition of the conceptual model, we decided to consider three relevant aspects of the whole holiday (considering the trip "from door to door"): the journey, the stay in the destination (including the fruition of several services as accommodation, catering, cultural and recreational activities, etc.) and the building of the hospitality structure (which is a fundamental aspect of a tourist destination). The selection of these aspects for Life Cycle Assessment considers also the possible connections with Ecological Footprint's methodology, which includes the impacts deriving from waste production and from 5 categories of consumption: transportation, food, goods, services, and building.

2.1 Conceptual model

The conceptual model developed consist of two sections: analysis of the role of LCA as a source of information to support decision makers; analysis of possible integration between LCA and Ecological Footprint of tourism (according to the component model methodology).

The first part of the model analyzes the relation between LCA of the three aspects of tourism considered (building of hospitality structures, staying in the destination, journey) and the role of stakeholders in the decision-making process: local administrators play an important role in spatial planning, selecting building areas and giving permissions for the building of hospitality structures and facilities; entrepreneurs (directly or indirectly involved in tourism activities) determine the type of tourist services available for tourists, influencing their possibility for making sustainable consumption choices; tourists make consumption choices which are

limited by the effective availability of sustainable products and services and are determined by their environmental consciousness and responsibility.



The second part of the model explores the possibility of integration between LCA and Ecological Footprint of tourism. There are several implementation at local scale of the original model developed by Wackernagel and Rees, and some new models developed for the assessing of Ecological Footprint of tourism (see, for instance, Castellani and Sala, 2008); however, the development of equations able to evaluate the footprint of tourism starting from local tourist data (considering all the possible categories of consumption) represents a challenging task, that have to include necessarily the use of proxy data. For this reason, the definition of LCA studies about the three aspects of tourism activities could be a valuable integration for the existing model, enabling to use more detailed and local data. Starting from these remarks, the second part of the conceptual model identifies the relationship between the three aspects considered for LCA and the categories of consumption included in the Ecological Footprint of tourism method.

3. Conclusions

In conclusion, starting from the previous remarks, we highlight the importance of the implementation of LCA to tourism sector and of its integration with Ecological Footprint of tourism methodology, because LCA has valuable potential for the validation of Ecological Footprint methodology and for the development of instruments able to support decision making both for individuals (tourists or tourist operators) and public administrations (e.g. for spatial planning of the destinations).

Further development of the research could include widen Life Cycle Analysis of the three aspect of tourism activities (analysis of different kind of accommodation, about the management of the hospitality structures – consumption of resources and energy, waste production, etc); moreover, it would be interesting to integrate LCA and Ecological Footprint referring also to the life cycle of the destination, considering that, emerging and mature destinations can have different situations (e.g. about the level of urbanization and presence of second houses)

4. References

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