

## **SEASONAL TOURISM, CRITICAL STOCK-FLOW RELATIONS AND ISLAND SUSTAINABILITY**

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In assessing the long term sustainability of a socioecological system and explore transition pathways towards a more sustainable future, one should not only account for biophysical flows, but also understand the changes in the social structure that support these flows. The concept of social metabolism (Fischer-Kowalski and Hüttler 1998, Fischer-Kowalski and Haberl 2007), operationalized by the industrial ecology framework of material flow analysis (MFA) (see Weisz et al. 2007), is a first step in this direction. Its inherent strength lies in incorporating both the natural and social systems and focusing on the overlap between the two, i.e. the social activities which have a direct material impact on the ecosystem.

The social metabolism approach can be particularly useful when applied to islands, because islands are closed systems in some regards, with clear physical boundaries, relatively small geographical areas, and comprehensible driving forces that can be disaggregated and experimentally controlled. Yet, in the modern, interdependent world, these same properties confront island populations with the challenges of limited resource availability, tenuous resource security, higher prices and limited natural carrying capacity (Deschenes and Chertow, 2004). This makes islands excellent focal points for studies that systematically analyze the interactions between human activities and the environment, in an attempt to move toward systems and practices that are sustainable in the long-term.

Using the island of Samothraki in NE Aegean (Greece) – a future UNESCO Biosphere Reserve in its entirety – as a case study, this contribution aims at advancing the concept of social metabolism with special reference to the specific constraints of the island context, where resource and user flows are not only limiting, but also highly fluctuating. We believe that in places where tourism, rather than industry, has been the primary economic driver, the role of tourists as key drivers of change must be specifically addressed. The key question we want to tackle is how the seasonal variability of tourist flows relates with the island's infrastructure. Methodologically, we approach the issue by performing a more traditional MFA, also assessing which material flows are use-dependent, and complement this with an attempt to model the highly seasonal tourist flows, their respective material demands and the impacts this has on infrastructure.

A comprehensive analysis of the flow of materials, as well as of resource users, is of crucial importance in order to assess the energy production, waste management as well as food production and consumption systems, highlighting opportunities for improving resource efficiency and self-sufficiency and evaluating the potential effects of localisation respectively. One can subsequently address those issues by aiming to maintain the level of service/benefit at reduced rates of resource use, following the idea that an environmental goal can bring about collateral socio-economic benefits, in the form of green jobs, improvement of the production/value chains of agriculture, income security, natural resource security and community savings.

The strengths and limitations of the MFA approach, including overcoming problems of data availability, will be discussed and insights derived from our work in Samothraki will be generalised with great care. We suggest that in cases where resource users (in

our case tourists) are highly fluctuating, modelling their distribution, as well as their material demands can help us better understand such a 'dynamic' social metabolism. Finally, the relevance of our approach and findings to local policy and community resource management is examined.

## References

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