



RUHR-UNIVERSITÄT BOCHUM

Tourism and global environmental change

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Outline of the presentation

- Introduction
 - The nexus of tourism and global environmental change
 - Disciplinary perspectives – ways of understanding the world
 - A pragmatic approach to understand how tourism (and residential tourism in particular) influences water consumption and supply
- Research on urban-tourist land change, water consumption and supply
 - Along a climatic gradient in Spain (methodological focus)
 - Across the range of urban-tourist form (tourism model focus)
 - Climatic sensitivity (urban sustainability and tourism model focus)
- Water resources and water consumption on Mediterranean Islands – the case of Mallorca

Global environmental change

- An entire field of theoretical and applied research
- Areas include
 - biodiversity and ecosystem services
 - **water resources,**
 - **climate change,**
 - international agreements,
 - North-South relations,
 - **land use and cover change,**
 - institutions and governance
- Interpreting global environmental change to mean the outcome of processes that are manifest in localities, but with consequences at multiple spatial, temporal and socio-political scales.

Compare: Global Environmental Change (Journal): aims and scope

Tourism and global environmental change

- Tourism is an important driving force of global environmental change
- If tourism were a country, its emissions would come fifth, after the United States, China, the European Union, and Russia
- Tourism sector's growth in CO₂ emissions may exceed 150% between 2005 and 2035 (technology-adjusted, business-as-usual scenario)
- Volume growth in tourism arrivals is unquestioned, international tourist arrivals projected to double by 2020
- Expectation of even greater growth in domestic tourist volumes

Gössling et al. 2010

Tourism and global environmental change

- Climatically sustainable tourism?
 - Mobility, accommodation and activity patterns of a growing number of tourists can be delivered in a way that allows for simultaneous volume growth *and* reductions in GHG emissions
 - Technocratic views on solving the problem dominate the debate
- Climate change would imply that the currently dominant group of international tourists –sun and beach lovers from Western Europe- would stay closer to home
- Global changes in tourism demand induced by climate change are generally much smaller than those resulting from population and economic growth

Gössling et al. 2010; Hamilton et al. 2005

Perspectives on tourism

- “The ‘trick’ of tourism capitalism is its ability to commodify entire places and all they contain.” (Gibson 2009, p. 529)
- Tourism as a ‘global strategy for sustainable development’ (Wolf-Michael Iwand, former head of Environment of German tour operator TUI, in 1999)
 - Notion that growth can be reconciled with sustainable development, and that tourism growth may even be a precondition for sustainable development
- Tourism requires and uses a geographical space
- This space can act simultaneously as a factor influencing the location of tourism, as a resource supporting a wide range of activities, and as an attraction in its own right

Gössling et al. 2010; Martín 2005, p. 572

The materiality of tourism

- “One could argue that the Costa del Sol provides all this through imaginings, representations and the social construction of space [...]. But it is undeniable that first of all the Costa del Sol was able to provide many things *materially*. The geographical area has innate properties humans work with [...]. After all it has not been called the sunshine coast for nothing: it boasts an average of nine hours of sunshine a day.”

O'Reilly 2009, p. 133

Leitmotif of this talk:

illuminating complex environmental, economic, and political relations and their spatiality is one aspect, analyzing if and how these exist is another aspect - this has to be done *in concreto*, and empirically

Climate change and resource tensions

- Climate change in the Mediterranean
 - Future warming will be above the global average, especially pronounced in the summer season
 - Decreasing winter precipitation (-20%)
 - More frequent dry periods
 - Reduced groundwater recharge
 - Issues of water balance and water availability will probably become more important than nowadays
- Water management is becoming a major challenge for Mediterranean countries and the tourism sector

Hertig et al. 2012; Iglesias et al. 2007; Jacobeit 2000; Jacobeit et al. 2007

Research on urban-tourist land change, water consumption and supply

Urban-tourist use of water resources

- Regional perspective: Mediterranean coastline
- Addressing issues such as variability in supply, increasing demands for water, environmental flows, and land use change
- Stressors: variations in temperature and precipitation (meteorological exposure) – exacerbated by climate change
- Precipitation shortfall, groundwater overdraft
- Adaptation (*maladaptation*) strategies - facing tradeoffs:
 - Unconventional sources of water supply
 - Dependence on desalination, high energy demand (CO₂)
- Spain: largest production of desalinated water in the Mediterranean, third largest production worldwide (8% share)

Gössling et al. 2012; Lattemann 2011; Maestu & Gómez 2010; Saurí et al. 2011

Spain:

- Urbanization process concentrates water pressure along the Mediterranean coastline and in the metropolitan areas
- Urban water uses have growing share of total water demand: 10% (2002)
- Residential sector: 70% of urban use
- Per-capita water consumption has increased since 1996 at an annual average rate of 2%
- Water prices increased by 4% every year over the last decade
- Recreational uses (tourism, golf courses, swimming pools, second homes) most rapidly growing
- Climate change, water resources and tourism: some basic relations

Objectives – research example #1

- Assessing the potential outdoor water consumption on private parcels
- Comparison along a climatic gradient (location-for-time substitution)
- Synoptical and targeted mapping of the determinants of outdoor water consumption - artefacts (gardens, swimming pools)
- Separating turf grass and trees/shrubs plantings
- Requires high geometric resolution, as training and reference data are sampled from the image data (inaccessibility of private parcels!)
- Comparison of methods and image data (compare Wolf & Hof 2013, in *EARSeL eProceedings*)

Hof, A. & Wolf, N. (revisions). Estimating potential outdoor water consumption in private urban landscapes by coupling high-resolution image analysis, irrigation water needs and evaporation estimation in Spain. *Landscape and Urban Planning*.

Urban-tourist water supply and water consumption in Mallorca

- Across the range of urban-tourist form
- Climatic sensitivity

Water consumption and urban-tourist model – methods (research example #2)

- Assess the relative importance of the residential and tourist sector
- Derive residential water budgets and establish spatial indicators
- Assess the spatial variability of urban form, water consumption, and sensitivity to climate change
 - Conversion of monthly per capita water consumption and per capita pool and garden area into standardized z-scores
- Assess the relationship between the sensitivity of per capita consumption to changes in temperature and precipitation
 - $\Delta\text{Cons}/\Delta\text{Temp}$ – units: litres/ person/ day per 1° Celsius
 - $\Delta\text{Cons}/\Delta\text{Prec}$ – units: litres/ person/ day per 1 mm
 - Spearman rank-order correlation coefficient between land use variables and $\Delta\text{Cons}/\Delta\text{Temp}$, and $\Delta\text{Cons}/\Delta\text{Prec}$ – spatial variability of climate sensitivity
- First step: consumption data, population and land use inventory

Hof (2011)

Water resources and water consumption on Mediterranean Islands – the case of Mallorca

The challenges

- Insularity – limited access to remote aquifers
- Reliance on groundwater – a resource already under pressure
- Desalination as *maladaptation* strategy
- The condition of the water supply network
- Tourism model shift – strategic move towards a higher quality, low-season model and possible negative effects in terms of sustainability of water resources (Deya and Tirado 2011)
- Competing demands (urban, tourist, agriculture)
- Climate and global environmental change

Conclusions

- “Analyses that are critical are understood to be part of the praxis of social and political change aimed at challenging, dismantling, and transforming prevalent relations, systems, and structures of exploitation, oppression, imperialism, neoliberalism, national aggression, and environmental destruction.” (Source: ACME: An International E-Journal for Critical Geographies: <http://www.acme-journal.org/Home.html>); accessed 7 November 2013



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Thank you for your attention!

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