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CHANGE THEORIES DRIFT CONVENTIONAL TOURISM INTO ECOTOURISM

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Abstract: *The extension of the conventional tourism practices along with fast development in tourism industry (TI) brings considerable benefits to regional economics. there are also negative interferences of some diverge vectors opposing the application of any renovated theories to reach the conventional tourism to Ecotourism i.e. the accessibility of drinking water and the availability of agricultural soil, water consumption, solid waste (SW) disposal and their transfer facility, and tourists transportation. In this regard, this study is the first study put theories with reliable tools for benchmarking the environmental performance (EP) via the assessment of the aforementioned impacts and their Touristic Ecological Footprint (TEF) and the Tourism Ecological Balance (TEB) in a civilized community.*
Keywords: *regional economics, Solid Waste, Ecological Balance*

INTRODUCTION

In some locations, uncontrolled conventional tourism has been accused of failing to integrate its structures with the natural features and indigenous architecture of the destination. Large dominating resorts can look out of place in any natural environment and may clash with the indigenous structural design (Gun, 2008). By the hand, hotels are large consumers of water. A tourist staying in a hotel uses an average 1/3 more water per day than a local inhabitant and the energy consumption per m^2 per year by a one star hotel is 157 kWh (380 kWh in a four star hotel) (EEA, 2003). However, most of the time the infrastructure is not designed to cope with peak periods. Tourism especially nature tourism, is closely linked to biodiversity and attractions and it may generate positive impacts (economic growth, social well-being and environmental preservation) Rabbany, Afrin, Rahman, Islam, and Hoque (2013). On the other hand, it is both vulnerable to climate change impacts and contributes to climate change by its high levels of GHG emissions. In addition, tourism creates great pressure on local resources such as energy, food, land and water that may already be in short supply producing negative impacts i.e. environmental degradation caused by the architectural pollution; issues regarding collection, waste disposal and treatment of sewage; noise and air pollution; and erosion ensuing from sports practice in tourist destinations (Wray et al., 2010). The growing number of tourists visiting sensitive natural areas may also jeopardize nature conservation (McKercher and Robbins, 1998). Some conflicts may also arise between tourism development and other sectors such as agriculture and forestry Sancho, Green, and Pintado (2007). Traditional and conventional tourism industry generally overuses water resources for hotels, swimming pools, golf courses and personal use of water by tourists, and in-house irrigation for gardening (UNEP, 2007). This can result water shortages and degradation of water supplies, as well as generate a greater volume of wastewater. Forests often suffer negative effects of tourism in the form of deforestation caused by fuel wood collection and land clearing (Gasparri and Grau, 2007). This is the case in many valuable coastal areas like in the Mediterranean countries where the forests were cleared for the construction of summer houses and hotels during the last three decades (Palahi, 2007). The island of Mykonos (Greece) is a well known international tourist resort, which has experienced rapid touristic development during the last 30 years. Parallel to the expansion of the TI (accommodation, bars, etc.) the island's population has also increased in size, in contrast to other Greek islands that have lost population over the last decades (EC, 2002). This growth was followed by the expansion of the infrastructure (enlargement of the port, improvement of the road network, construction of a surface dam, etc.). These investments have further boosted the island's capacity to accommodate tourists and other visitors. Problems and some signs of saturation have already appeared: congestion, lack of parking space, higher crime rate, severe water and soil pollution, and loss of flora and fauna especially during the peak summer season. A large proportion of the island's extremely limited land surface has either been absorbed by intensive housing construction. Tourism development and its accompanying infrastructure were left unused for future speculation, causing widespread loss of agricultural land. These traditional malpractices in TI in the island together with other newly developed villages on which the TI was based mainly during the first phase of development have already been transformed in scale, volume of built-up areas, character and environmental quality as a result of uncontrolled and rapid development of tourism (Coccossis and Parpairis, 1996). As a result of the rapid urbanization that alters the socio-economic structure and local culture, tourism now accounts for energy production emissions and more than 60% of air travel. Therefore is responsible for an important share of air emissions such as carbon dioxide (CO_2). These emissions are linked to acid rain, global warming and severe local air pollution (Coccossis and Parpairis, 1996).

Therefore, this newborn work aims to adopt certain theories to measure TEF and TEB in order to define biologically productive lands fit tourists activities and capacitate their footprints in their destinations.

LITERATURE REVIEW

Few researches were found working on the development of this industry. Through the available literature reviews, Wackernagel and Rees (1996) and Gössling, Borgström-Hansoon, Horstmeier, and Saggel (2002a) had devised TEF method appraises the environmental impact of tourism and by turn discriminates the bio-productive, built and fossil energy lands but they failed twice: (1) to cover the estimation of the TEF as a result of some environmental aspects i.e. water consumption and SW generation in hotels, and fossil fuels from marine transports, (2) to involve the estimation of the ecological balance, as well as the consequent ecological deficit or surplus.

Besides, in 2012, Gössling et al. recommended implementing water resources category in alike studies in both water shortage and the relatively abundant water resource areas (Gössling et al., 2002b).

METHODOLOGY

In the system of this work, choosing some definitive categories of tourists consumptions regarding expected environmental impacts had facilitated the formulation of the equations involve transportation, quarters of lodging (i.e. hotels, dormitories, and other accommodation facilities), touristic activities, and food and garment consumptions. These equations calculate the ecological footprints, TEF, TEB, and the Bio-capacity of the area.

Measurement System Analysis (MSA)

TEF measurements in built lands: EF (BL. Air Transport)

The measurement is taken in order as follows:

1) Estimate the total number of tourist's leisure throughout the destination in a year;

2) Define the transport infrastructure area (ha) used by tourists (airports, ports, airfields, parking lots, highways, and railways);

3) Take the sum of all areas;

4) Divide the total area by the number of tourists.

TEF measurements for transport expressed as fossil fuel energy: EF (T. FFE. Transport)

Those measurements are divided into two parts A. air transport and B. marine transport

A. The measurement is attributed to air transport and is taken in order as follows: EF (FFE. Air Transport)

1) Estimate the total number of passengers per flight;

2) Estimate the distance traveled per flight;

3) Determine the total distance flown in passenger-kilometer (pkm), by multiplying the flown distance (km) by the total number of passengers;

4) Multiply the total distance flown (pkm) by the energy intensity factor (2MJ/pkm) to obtain the energy consumption of the flight;

5) Convert the result found on item "4" into GJ., considering 1 GJ = 1,000 MJ;

6) Divide the Biomass energy consumption of the flight (GJ) by the total passengers to identify the per capita biomass energy consumption (GJ cap^{-1});

7) Divide the per capita biomass energy consumption by 73 GJ ha^{-1} yr^{-1}, where yr means year, to determine the amount of per capita fossil fuel energy required (ha cap^{-1});

8) Estimate again the fossil fuel energy land required per passenger, by multiplying the quotient of item "7" by the elevation correction factor.

B. The measurement is attributed to marine transport and is taken in order as follows: EF (M. Transport)

1) Estimate the total number of tourists per ship;

2) Estimate the quantity of liters of fuel required by a ship in one round trip;

3) Identify how many ships (which transport tourists) at the dock island port during one year;

4) Multiply the total liters of fuel consumed by a ship by the number of ships arriving the port in a year; 5) Convert the fuel consumption in liters into giving off tons of CO_2 assuming that 1 liter of diesel emits 0.00315 metric tons of CO_2;

6) Divide the total amount of CO_2 found in previous item by one, since one metric ton of CO_2 is absorbed by one hectare of land;

7) Divide the amount found in the prior item by the total number of passengers who arrive at the port; 8) Estimate again the required fossil fuel energy land per passenger, by multiplying the quotient of the previous item by 1.37, value corresponding to the global productivity of land.

TEF measurements for water consumption: EF (Water)

The measurement is taken in order as follows:

1) Estimate water consumption in (m^3) for one tourist, considering that the consumption average is 120 liters/guest/day and 1 liter equals 0.001 m^3;

2) Calculate the total amount emitted of CO_2, considering that 0.37 metric tons of CO_2 are emitted per each liter of water used during the process of treatment, plumbing and distribution;

3) Estimate the total number of beds occupied in hotel in one year;

4) Multiply tourist's water consumption by the total number of beds in the lodging.

TEF measurements for Solid waste (SW): EF (SW)

1) Estimate the daily amount produced of SW in kg by one tourist;

2) Estimate the average residence period (days) of the tourist in the destination;

3) Find the product of step 1 and step 2;

4) Convert the product in the last step into tons of CO_2 taking into account that 0.00135 tons of SW is equivalent to 0.00045 metric tons of CO_2;

5) Multiply the result found in the 4rd step by "two", since 1 ton of CO_2 and 1 ton CH_4 are generated;

6) Estimate the number of tourists who pay visit the destination in one year;

7) Find the product of the estimated values in the 5th and 6th steps.

TEF measurements for Lodging: EF (T. Lodging)

These measurements are divided into two parts C. Built lands and D. Fossil energy

C. *The measurement is attributed to Built lands and is taken in order as follows: EF (BL. Lodging)*

1) Estimate the required area per bed, taking into account that the requisite amount of built lands per bed is 60 m^2; the required area for a luxury inn is 200 m^2, 100 m^2 for (1 and 2- star hotels), 300 m^2 for (3 and 4-star hotels), 2,000 m^2 for (5-star hotels), 300 m^2 for apartment, 50 m^2 for private houses, 15 m^2 for boats (including the port area);

2) Estimate the total number of beds from the hotel infrastructure list;

3) Multiply the required land area per bed by the total number of beds that the lodging has.

D. *The measurement is attributed to Fossil Fuel energy and is taken in order as follows: EF (FFE. Lodging)*

1) *Estimate the energy consumption for one bed, considering that the average consumption is 50 MJ/bed/night in rural lodgings and 130MJ/bed/nights for lodgings in traditional hotels;*
2) *Estimate the electricity consumption (MWh) employing in the tourist activity in one year;*
3) *Convert the result found in the last stage into GJ, considering that 1MWh is equivalent to 3.6 GJ;*
4) *From hotels infrastructure - Estimate the total number of beds occupied in one year;*
5) *Multiply the electricity consumption for 1 bed by the total number of beds in the lodging.*

TEF measurements for Leisure activities: EF (Leisure Activities)

In 2002, Gossling et al. took into account only the areas in the golf courses (Gössling et al., 2002a), but in this study the measurements cover all the leisure activities.

The measurement is attributed to Built lands and is scheduled in order as follows:

1) The total number of leisure is estimated for a year;

2) Total area (ha) of the leisure place in certain destination is estimated;

3) The total occupied area in last step is divided by the number of tourists in the destination.

TEF measurements for Bio-productive (food and garment) consumption: EF (Bp. Food and Garment)

In order to accomplish the calculation of the food and garment category, Gossling et al.(2002a) took into account that tourists in their destinations buy the same foodstuff and garment available in their home countries. The annual average consumption of each individual is available in the living planet report (WWF). Considerably, in this study the measurements are scheduled downward in a proper and useful way:

1) Identify the nationalities of tourists who visit the destination that will be researched;

2) Identify the annual consumption quantity of each criterion food and garment in their hometowns;

3) Add up all the annual consumption quantities of food and garment;

4) Work out the tourist' annual average consumption;

5) Dividing the value found in item "4" by 365 or 366 (leap year);

6) Multiply the value found in item "5" by the average period stay of a tourist in a year.

RESULTING EQUATIONS

All the measurements in the Methodology are participated in the following equations as follows:

$$EF\ (T.\ FFE.\ Transport) = EF(FFE.\ Air\ Transport) + EF\ (M.\ Transport) \quad (1)$$

$$EF\ (Fossil\ Energy) = EF\ (T.\ FFE.\ Transport) + EF(FFE.\ Lodging) + EF\ (Water) + EF\ (SW) \quad (2)$$

$$EF\ (Built\ Lands) = EF\ (BL.\ Air\ Transport) + EF\ (BL.\ Lodging) + EF\ (Leisure\ Activities) \quad (3)$$

$$TEF = EF\ (Fossil\ Energy) * 1.8 + EF\ (Built\ Lands) * 3.2 + EF\ (Bp.\ Food\ and\ Garment) \quad (4)$$

After identifying the TEF, the next step concerns the calculation of tourism ecological balance (TEB), as a way to express the ecological deficits or surpluses (Ecological Deficit > Bio-capacity > Ecological Surplus):

$$TEB\ (ha) = TEF\ (ha) - Bio\text{-}capacity\ of\ the\ area\ (ha) \quad (5)$$

where,

$$Bio\text{-}capacity\ of\ the\ area\ (ha) = Actual\ Physical\ Area\ (ha) * Yield\ Factor * Equivalence\ Factor \quad (6)$$

CONCLUSIONS

As a result of the adopted theories-based range in the measurements of TEF (for the following categories: built lands, transport, water consumption, SW, Lodging, Leisure activities, Bio-productive (food and garment) consumption) and TEB, it's expected that will bring future rapid dynamical changes in the culture of TI and also will contribute to the mitigation and if possible the elimination of negative impacts of TI.

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