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TOWARDS THE DEVELOPMENT OF SUSTAINABLE TOURISM INDICATORS FOR THE PHILIPPINES

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Towards the development of sustainable tourism indicators for the Philippines

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Abstract

While tourism as an economic activity contributes to the growth of an economy, it also contributes "to irreversible damage to the environment" which may affect tourism in an area. In order to establish tourism as sustainable source of growth, policy makers should be able to examine the negative externalities resulting from tourism activities. Moreover, there should also be some metric for the assessment of interventions aimed at mitigating the adverse effects of tourism on environment. This study attempts to establish with a provisional methodology for the compilation of indicators measuring some of the impacts of tourism activities om the Philippine environment. The estimation strategy we employed involves the use of the Philippine Input-Output tables and the Philippine Tourism Satellite Accounts (PTSA) in generating indicators. We were able to generate statistics on the energy use and water use for each of the tourism industries highlighted in the PTSA. The hope is that this study would serve as a first step towards the generation of other indicators that are meant to guide planners in crafting and evaluating policies for sustainable tourism.

I. Introduction

For many countries, one of the key drivers of economic growth is tourism. We learn from economics, however, that benefits do not come without costs. Tourism, as a means to growth, is no different. While tourism as an economic activity contributes to the growth of an economy, it also contributes "to irreversible damage to the environment" (IRTS, 2008) which may affect tourism in an area.

The economic literature examining the impact of growth and development on the environment is expansive. Policy makers and researchers have been very keen on studying the externalities of growth drivers, especially now that climate change is becoming a global threat. It stands to reason that tourism, being an agent of economic expansion, is also causing negative impacts to the environment, and thus, requires attention. In order to establish tourism as sustainable source of growth, policy makers should be able to examine the negative externalities resulting from tourism activities.

We often hear the maxim "we cannot manage what we cannot measure." In order for government to implement policies that would address that would mitigate the environmental impact of tourism, statistical agencies should also be able to produce some metric for the assessment of these interventions.

This study attempts to establish with a provisional methodology for the compilation of indicators measuring some of the impacts Philippine tourism activities has had on the environment. The estimation strategy we employed involves the use of the Philippine Input-Output tables and the Philippine Tourism Satellite Accounts (PTSA) in generating indicators for the environmental impacts of tourism. We were able to produce indicators on the energy use and water use for each of the tourism industries highlighted in the PTSA. The hope is that this study would serve as a first step towards the generation of other indicators that are meant for guide planners in crafting and evaluating policies for sustainable tourism.

Several statistical agencies have initiated efforts to measure sustainable tourism. Most of the attempts, however, are still in the experimental stage. As of the writing of this paper, the United Nation's World Tourism Organization (UNWTO) is in the process of drafting a measurement framework that will serve as a global standard for the estimation of sustainable tourism indicators. Different statistical agencies applied different approaches in measuring the environmental impact of tourism on the environment (Obst, 2018).

Jackson, Kotsovos and Morisette (2018) of Statistics Canada (StatCan) examined the impact of tourism to the environment by measuring the environmental pressures "caused" by tourism activities. They estimated the energy use and greenhouse gas emissions of air transportation and food and beverage services industries by linking the Canadian Tourism Satellite Accounts (CTSA) and the Canadian System of Environmental and Resource Accounts (CSEEA). The CSEEA-Physical Flow Accounts incorporates measures of water use, energy use, and greenhouse gas emission by all industry. Both the CSEEA and CTSA follow the same Supply and Use Table (SUT); hence, linking the two frameworks would likely yield estimates that are internally consistent.

Meanwhile, the Italian National Institute of Statistics (IStat) applied a "hybrid environmental flow accounts for tourism" (Anzalone, 2014). In this method, a macro-accounting approach was used to measure the link between tourism and the environment. The agency released experimental estimates contribution of tourism activities to GHG emissions and energy use (Tudini et. al., 2018).

Fiji Bureau of Statistics (FBS), on the other hand, studied the feasibility on the relevance and feasibility of a statistical framework to measure sustainable tourism in the country. The result of the study showed that a statistical framework was highly relevant and feasible in Fiji. As of the writing of this paper, Fiji has not made public any estimates resulting from their efforts in developing sustainable tourism measures.

The studies initiated by StatCan, IStat, and FBS all emphasized the need for a consistent accounting framework. Various studies, however, points out that sustainable tourism indicators could be generated without necessarily requiring a framework for the estimation process. Farsari and Prastacos (2001) identified various tourism indicators sourced from resorts in Mediterranean region. According to them, "indicators for sustainable tourism are tools for assessing tourism development and estimate the economic, natural and socio-cultural environmental implications." The study proposed set of sustainable tourism indicators that could serve as a tool in evaluating development and practices of tourism in Mediterranean region. In Macedonia, sustainable tourism was measured through the assessment of indicators as identified by the UNWTO (Dimoska and Petrevska, 2012). The study used secondary data obtained through desk-research.

In the case of Saudi Arabia, the Saudi Commission for Tourism & National Heritage used the TSA approach, in order to measure the impacts of tourism to the environment, despite of the absence of environmental accounts (Al-Saleemi, 2018). The purpose of the study in Saudi Arabia was to identify indicators for the three dimensions of sustainable tourism: economic, social and environmental.

This study extends the literature by using the Input-Output tables as a critical element in the estimation process. As it will be explained later, this process would make it easier for countries that do not have environmental accounts to compile sustainable tourism indicators. To our knowledge, we are the first statistical agency to apply this approach in generating indicators for sustainable tourism.

In Part II of this paper, we briefly describe the measurement framework the adhered to in the estimation process and the rationale for adhering for the said framework. Part III outlines in detail our estimation strategy and Part IV would briefly describes the estimates. Finally, Part V would discuss how we intend to move forward with the methodology that currently have, keeping in mind that this is a work in progress.

II. Measurement framework

IRTS 2008 recognizes the need to address the challenge of measuring the environmental externalities of tourism activities. In order to do so, it is often deemed necessary to bridge two international-accepted frameworks: the Tourism Satellite Accounts and the System of Environmental-Economic Accounting (SEEA) Central Framework. As identified in the IRTS 2008, there are two ways to link the aforementioned frameworks: (1) to incorporate tourism as a specific set of industries and of consumers within the hybrid flow accounts of the environmental accounts, and (2) "greening" the tourism GDP that is derived from the Tourism Satellite Account by taking into consideration the cost of the degradation of the environment and the use of the natural capital by tourism; expenditures that prevent degradation could also be taken into consideration as a further adjustment.

For this study, we attempt to follow the first approach stated in the IRTS 2008, which is the generation of a hybrid flow accounts for tourism industries. In this exercise, we try to adhere to the concepts of macroeconomic accounting laid out in the System of National Accounts, while incorporating the elements of the SEEA Central Framework and IRTS 2008. We believe that this strategy would allow us to generate intuitive estimates that can easily be used for policy formulation. Many policies in the Philippines rely on data generated using the same accounting framework. We hope that by applying the same framework, policies derived from these estimates would be internally consistent with other policies. Moreover, many of the statistical instruments (household and industry surveys, census, secondary data, etc.) available for the Philippine Statistics Authority (PSA) and the rest of the Philippine government, were all designed to adhere to the concepts of the System of National Accounts. Abiding by the same framework would facilitate the ease of data collection required for the estimation.

III. Estimation Strategy

One of the main hurdles faced by many countries in coming up with estimates of the environmental impact of tourism is the absence of a set of environmental accounts. As mentioned earlier, the key idea in MST is combining the TSA and SEEA for a coherent measurement of the environmental impact caused by tourism. For countries that do not have a set of environmental accounts (or for countries that were able to compile environmental accounts before but do not compile them in a regular basis), this task becomes daunting.

The Philippines is no different from these countries. The Philippines, through the efforts of the National Statistical Coordination Boards (NSCB), the precursor of the

PSA, was able to compile environmental accounts in prior years. Among the accounts compiled by the agency were water~~s~~ resources accounts, mineral accounts, as well as land and soil resources accounts. However, these were one-off compilation efforts and the updating of databases for these accounts took several years since 2003. In 2015, the PSA released a set of mineral resource accounts for gold, copper, chromium, and nickel through the World Bank-funded initiatives, the Philippines Wealth Accounting and the Valuation of Ecosystem Services (Phil-WAVES) project. The agency is also embarked in efforts to compile a set of water accounts, energy resource accounts, and timber accounts, among others. These exercises, however, are still at their development stage and the PSA has not been yet released the official statistics from these initiatives (with the exception of mineral accounts).

Considering that there are visible efforts to compile environmental accounts, does the Philippine have the data required to estimate the impact of tourism on the environment? The answer depends on the chosen compilation approach. National statistics offices that have attempted to pilot the estimation of MST indicators would often utilize results from their respective TSAs and environmental flow accounts. For instance, IStat combines the estimates of their TSA with their emission accounts and physical energy flow accounts to produce data on the contribution of tourism activities to GHG emissions and energy use (Tudini et. al., 2018). Using a similar approach, Statistics Canada likewise generated data on GHG emissions, water use, and energy use from tourism activities. The agency used data from its TSA, water accounts, energy accounts and GHG accounts (Kotsovos, 2017). As mentioned before, this approach would prove difficult for countries that do not produce environmental accounts. As discussed Part II of this paper, counties were able to circumvent this by limiting the coverage of the estimates, either by confining the exercise to cover only a certain tourism activity, as in the case of Saudi Arabia, or by identifying specific destinations covered by the estimates, as in the case of Austria (Obst, 2018).

While the Philippines is devoting a lot of effort into the generation of environmental accounts these efforts have not generated datasets that would be useful in the compilation of indicators assessing the impact of tourism on the environment. In this pilot study, we depart from the conventional approach of depending on environmental accounts to estimate the environmental impact of tourism. Instead, we utilized the Input-Output (I-O) Accounts and the Philippine Tourism Satellite Accounts to generate our estimates.

Disaggregate measurements of the economic structure of economy are not usually found in standard releases of the National Accounts. Hence, the national statistics offices compile I-O Accounts in a matrix table. Conceptually, the I-O Accounts shows the interrelationships of industries in the economy—how other industries and final consumers use the output of one industry. I-O tables are typically released with four quadrants. The first quadrant shows in detail the level of inputs required by each industry to produce their output in a given accounting period (usually one year). We would be using this table quite extensively in our estimation procedure. The second and third quadrant shows the final demand and gross value added components, respectively. The fourth quadrant is the table of imported intermediate inputs as well as the trade and transport margins from the inputs of each industry. The latest available I-O Accounts generated by the PSA is based on the 2012 structure of the Philippine economy. Only quadrants 1, 2, and 3 are released by the PSA.

The second major source data of this undertaking is the Philippine Tourism Satellite Accounts (PTSA). This dataset provides information on tourism activities and industries such as total expenditure by tourists, total value added by tourism industries, total employment of tourism industries, and other related indicators.

Using these two main data sources, we were able to generate data on four indicators that represents how tourism is exerting pressure on the environment. These are: energy use, water use, carbon emissions, and solid waste. These indicators are also consistent with the impact measures identified by the UNWTO in its draft of "Statistical Framework for Measuring the Sustainability of Tourism" document (Obst, 2018).

The PTSA is compiled per expenditure items/products: 1) accommodation services for visitors; 2) food and beverage serving services; 3) transport services; 4) travel agencies and other reservation services; 5) entertainment and recreation services; 6) country-specific tourism characteristic goods (shopping), and; 7) miscellaneous items. Likewise, the direct value added from the tourism is compiled for each industry corresponding to the expenditure items mentioned about. In this exercise, we compile the environmental impact of five[1] of the above industries. These are:

Table 1. Industry classification for the sustainable tourism indicators

ISIC rev. 4	**Industry**
I 55-56	accommodation services and food and beverage services
H 49-53	transport services
N 79	travel agencies and other reservation services
R 90-93	entertainment and recreation services

We will describe in the following subsections how we estimated the energy and water expenditures of these tourism industries, as well as how we generated measures of CO_2 emissions and waste generated.

1) Water and energy use

As mentioned before, we utilized the I-O table extensively in the estimation procedure. To derive the estimates for total water use from tourism activates, we multiply the tourism expenditures from Internal Tourism[2] tables of the PTSA with the technical coefficient for water inputs of each of the *j* tourism industries from the I-O tables.

$$\widehat{W}_t^N = \sum_{i=1}^{j} G_{it}^N w_i \qquad (1)$$

Where G_{it}^N is the total internal tourism expenditure for tourism item/product *i* at time *t*, w_i is technical coefficient for water inputs of the industry equivalent corresponding to the expenditure for tourism item/product *i,* and $\widehat{W}_t^N$ is the estimated water use of tourism activities at time *t*. In this exercise, we assume that total expenditures on the tourism item/product is equivalent to the gross output of the industry producing the said item/product. We also assumed the input structure for tourism industries are identical to the input structure of all firms in the industry, as represented by the I-O

[1] Accommodation services and food and beverage services were combined into one industry to be consistent with the classification system in the 2012 I-O tables.

[2] This figure is sourced from table 4 of the Tourism Satellite Accounts. These expenditure items represent the total spending of both local and foreign tourists in the domestic economy.

Accounts. Note that these estimates are in nominal terms (units are in PhP). We convert the nominal estimates into physical terms by using appropriate prices.

We employ a similar approach in the estimation of energy inputs. Likewise, we multiply the tourism expenditures of each tourism industries from Internal Tourism tables of the PTSA with the technical coefficient for petroleum and electricity inputs of each of the *j* tourism industries from the I-O table.

$$\hat{P}_t^N = \sum_{i=1}^{j} G_{it}^N p_i \quad (2)$$

$$\hat{C}_t^N = \sum_{i=1}^{j} G_{it}^N c_i \quad (3)$$

$$\hat{E}_t^P = \hat{C}_t^P + \hat{P}_t^P \quad (4)$$

Where G_{it}^N is the total internal tourism expenditure for tourism item/product *i* at time *t*, p_i and c_i are the technical coefficients for petroleum and electricity inputs, respectively, of the industry equivalent corresponding to the expenditure for tourism item/product *i.* The terms $\hat{P}_t^N$ and C_t^N are the estimated petroleum and electricity expenditures of tourism activities at time *t*, respectively. We convert the nominal estimates into physical terms by using appropriate prices.

2) Carbon emissions

For this exercise, we assume that all Carbon Dioxide (CO_2) emissions from tourism activities are derived from energy use. In our paradigm, we consider CO_2 as a by-product of the process of transforming chemicals into kinetic energy.

From Part IV.1, we outlined the steps in deriving energy use from tourism activities. The final estimates from equation 4 would be in terms of "thousand barrels of oil consumed". We derive the level CO_2 from energy use following the steps described in Greenhouse Gases Equivalencies Calculator – Calculations and References of the United States Environmental Protection Agency (EPA).[3] For this exercise, we calibrate the parameters using localized information from the Philippines.

IV. Pilot Estimates

Using the estimation strategy discussed above, the sustainability of tourism indicators were measured for five tourism industries, namely: accommodation services and food and beverage services; transport services; travel agencies and other reservation services, and; entertainment and recreation services.

[3] We would not describe in detail the process estimating the CO_2 emission from energy use. We direct the readers to EPA website where the steps are explained in detail: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

In 2017, tourism industries consumed 6.7 thousand Gigawatt hours (GWh) of electricity. This is accounts for 0.08 percent to the total 82.0 thousand GWh used by the whole economy (Table 1). The electricity consumption growth was constant until it slowed down from 28.0 percent in 2015 to 21.0 percent in 2016. The consumption of petroleum and other fuel products by tourism industries, on the other hand, recorded a sudden acceleration of its growth rate to 53.4 percent in 2015 from 10.1 thousand MB in 2014. In 2017, the consumption of petroleum and other fuel products reached 21.9 thousand MB, making up 3.2 percent to the consumption of the whole economy (Table 2).

Both electricity and petroleum consumption recorded the fastest growth in 2015. In 2017, the total economy consumed 77.5 thousand KTOE of electricity, while tourism consumed 7.2 thousand KTOE or 0.09 percent to the total energy consumption (Table 3). From 2012 to 2017, the energy used by tourism industries grew by 178.4 percent.

The water consumption of tourism industries constantly increased from 2012 to 2017. The water used by tourism industries decelerated from 23.1 percent in 2014 to 14.2 percent in 2016.

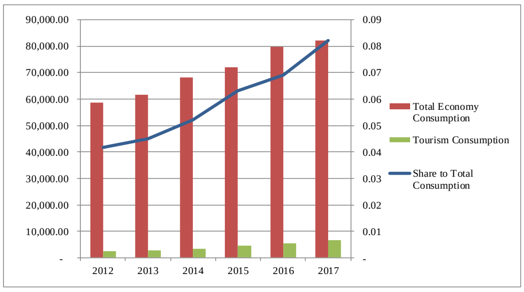


Figure 1. Electricity Consumption, in GWh, 2012-2017

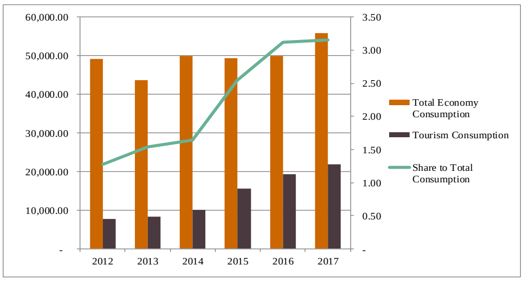


Figure 2. Petroleum and Other Fuel Products Consumption, in MB, 2012-2017

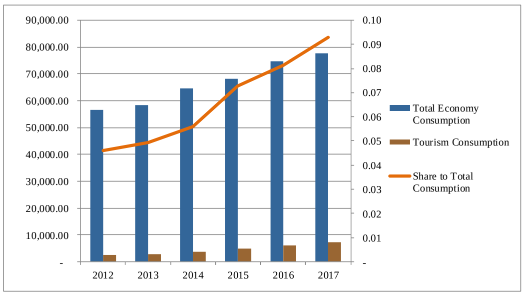
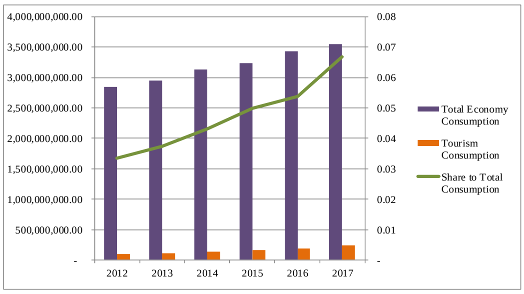


Figure 3. Energy Consumption, in KTOE, 2012-2017



Graph 4. Water Consumption, in cu. m., 2012-2017

This was until an increase in the water consumption by 29.0 percent in 2017. The consumption in 2017 is 237.3 million cubic meters (Graph 4). On the average, the water consumption of tourism industries grew by 20.2 percent from 2012 to 2017.

The carbon dioxide (CO_2) emissions in using petroleum and other fuel products and electricity are also measured using the estimation strategy discussed above. Tourism activities contributed 39.3 percent to the total CO_2 emissions in 2017 or 9.5 million MT CO_2/barrel. From 2012 to 2017, this consumption grew by 24.0 percent or an average of 182.2 percent. The CO_2 emissions in using petroleum and other fuel products had a drastic growth of 53.4 percent in 2015 from a growth of 22.3 percent in 2014. In addition, the electricity consumption of tourism industries shared 8.2

percent to the total CO_2 emissions in 2017or 3.6 million MT CO_2/barrel. On the average, the CO_2 emissions increased by 22.6 percent from 2012 to 2017.

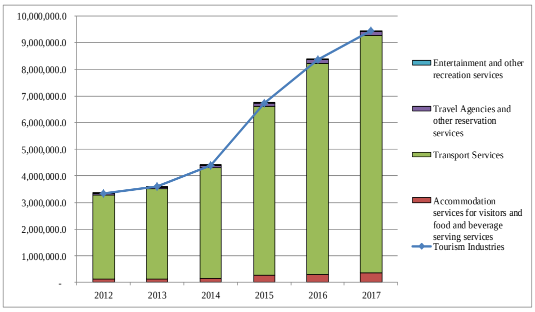


Figure 5. Petroleum and Other Fuel Products, Carbon Dioxide (CO2) Emissions, in MT CO2/barrel, 2012-2017

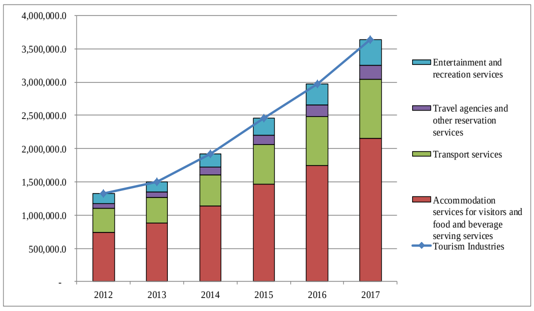


Figure 6. Electricity, Carbon Dioxide (CO2) Emissions, in MT CO2/barrel, 2012-2017

V. Way forward

What we described in this paper an experimental methodology in the estimation of sustainable tourism indicators. In particular, we were able to generate pilot estimates for water consumption, energy use, carbon emissions, and waste generation. What sets these set of estimates apart from the previous efforts made by other statistical agencies was the use of the I-O table. This allowed us to compile the set indicators without requiring a set of environmental accounts.

We hope to validate our estimates and seek comments from policy makers, the academe, data providers, tourism industry players, and other stakeholders in the coming months. We intend to refine the methodology in a way that it would fit the requirements of policy makers involved in the tourism sector.

We also recognize that much work is needed in the generation of sustainable tourism indicators. In particular, we intent to explore the following areas for future development: 1) linking flows to asset accounts to estimate rates of depletion degradation, 2) the generation of subnational sustainable tourism indicators, 4) estimates for solid waste by tourist, 5) and the use of dynamic parameters for short-term estimates.

We recognize that the methodology we worked on has some limitations and we are currently working to overcome some of these limitations. The advantage of our strategy, however, is that it is simple and intuitive. We believe that this approach is simple enough to be adopted by other countries for the generation of the indicators needed by their policy makers.

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