TECHNICAL NOTES
Measuring the Sustainability of Tourism

I. Introduction

Sustainability of tourism has long since been a topic of discussions in tourism circles around the world. Several initiatives and key contributions have been made by international organizations and bodies in an attempt to measure the sustainability of tourism. However, despite the long-standing interest and discussions to develop relevant sets of indicators that can support informed policymaking, there had been no standardized basis for integrating the different data and statistics encompassing the different dimensions of tourism development.

Recognizing the need to define standards for a framework that integrates the economic, environmental, and social aspects of tourism, the United Nations World Tourism Organization (UNWTO), in partnership with the UN Statistics Division (UNSD), launched an initiative entitled, “Towards a Statistical Framework for Measuring Sustainable Tourism (MST)” in 2015.

During the 6th International Conference on Tourism Statistics: Measuring Sustainable Tourism held in Manila in June 2017, the UNWTO enjoined the different national governments and administrations, international organizations, academia, private sector organizations, and civil society to join the efforts towards the development of an internationally-agreed statistical framework for measuring tourism’s role in sustainable development, including its economic, environmental, and social impacts across relevant spatial levels. As a response to this call for action, the Philippine Statistics Authority (PSA), through its Macroeconomic Accounts Service, has since started the efforts and initiatives on the compilation of MST in the country.

In 2018, the PSA presented the experience of the Philippines on the experimental measurement of sustainable tourism indicators during the UNWTO 18th Meeting of the Committee on Statistics and the Tourism Satellite Accounts held in Madrid, Spain.

In 2020, the PSA provided inputs to the UNWTO Publication entitled, “Experiences from Pilot Studies in Measuring the Sustainability of Tourism – A Synopsis for Policy Makers”. Together with those of the other participating countries, the publication highlighted the efforts and experience of the Philippines in the estimation of water consumption and energy consumption for tourism activities.

In 2021, PSA released the preliminary 2012 to 2020 estimates on MST in the Philippines, which provides the following tourism-related information, covering both the inbound and domestic tourism: water consumption; energy consumption from the use of electricity and petroleum and other fuel products; and carbon dioxide (CO_2) emission derived from energy use.

Sources:

(1) United Nations and World Tourism Organization. (2010). *International Recommendations for Tourism Statistics 2008*. New York: United Nations

(2) United Nations and World Tourism Organization. (2018). *Statistical Framework for Measuring the Sustainability of Tourism – Consultation Draft, October 2018*. New York: United Nations

II. Data and Data Sources

MST is compiled and presented in tables and accounts (see Section III.2). The data used in the compilation of the preliminary estimates on MST are obtained from several sources. Below are the major data sources for the compilation of MST:

Data	Description / Use	Source Agency
Philippine Tourism Satellite Accounts (PTSA)	Primary source for the preliminary estimates on water and energy consumption of tourism at purchaser’s prices	PSA

Data	Description / Use	Source Agency
	Provides information on the expenditures of resident and non-resident visitors within the country	
Supply and Use Table (SUT)	The 2018 SUT provides information on the structure of the Philippine economy. Primary source for the technical coefficients or ratios used in estimating the water and energy consumption of tourism at purchaser's prices The technical coefficients are computed by getting the ratios of the water supply, electricity, and coke and refined petroleum products used as input by industries over the their total intermediate consumption.	PSA
National Accounts of the Philippines (NAP)	Primary source of information used in deriving the overall consumption of economy The gross output of the Manufacture of coke and refined petroleum products, Electricity, and Water supply sub-industries of NAP are being used in the estimation.	PSA

Data	Description / Use	Source Agency
Water Production and Billing Statistics	Provides information being used in deriving the yearly average retail rate of water per cubic meter in the Philippines	Manila Water Company, Inc. (MWCI) & Maynilad Water Services, Inc. (MWSI)
Philippine Water Districts Average Yearly Water Rates		Local Water Utilities Administration (LWUA)
Average Retail Rate of Electricity	Provides information being used in deriving the yearly average retail rate of electricity per kilowatt-hour in the Philippines	Manila Electric Company (MERALCO)
Electricity Prices by electricity companies (2016) Electricity Sales and Consumption per Grid, by Sector - Power Statistics		Department of Energy (DOE)
Wholesale Posted Price and Prevailing Common Price of Petroleum	Provides information being used in deriving the yearly average retail price of petroleum products per liter in the Philippines	DOE
Greenhouse Gases Equivalencies Calculator – Calculations and References	Provides information on Emission Factors used to derive the carbon dioxide (CO_2) emissions from the use of electricity and petroleum	United States Environmental Protection Agency (US EPA)

III. Methodology

III.1. Estimation Methodology

Water Consumption of Tourism

Water consumption of tourism is derived by multiplying the tourism expenditure (TE) of inbound and domestic visitors for the year (t) with the technical coefficient for water inputs (TC_water) of specific industries from the 2018 SUT, divided by the average retail price of water per cubic meter (P_water) for the year.

Water consumption in cubic meter (m^3)

$$WC_t = \frac{1}{P\_water_t} \left\{ \sum_{i=j=1}^{5} \left[(TE_{i,t}) \cdot (TC\_water_{j,2018}) \right] \right\}$$

where:

i refers to the expenditure items, namely:

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

and,

j refers to the industries within the economy that corresponds to each of the expenditure items, namely:

1. accommodation
2. food and beverage service activities
3. transport (land, water, and air transport)
4. professional, scientific, and technical activities; administrative and support service activities
5. arts, entertainment, and recreation

Energy Consumption of Tourism

Energy consumption of tourism from the use of Electricity and Petroleum and other fuel products is derived by multiplying the tourism expenditures (TE) of inbound and domestic visitors for the year (t) with the technical coefficients for electricity inputs (TC_electricity) and petroleum inputs (TC_petroleum) of specific industries from the 2018 SUT, divided by the average retail price of electricity per kilowatt-hour and of petroleum per liter, respectively, for the year.

Energy Consumption of Tourism from use of electricity in Kilowatt-hours (KWh)

$$\underset{\text{Electricity}}{EC_t} = \frac{1}{P\_electricity_t} \left\{ \sum_{i=j=1}^{5} \left[(TE_{i,t}) \cdot (TC\_electricity_{j,2018}) \right] \right\}$$

where:

i refers to the expenditure items, namely:

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

and,

j refers to the industries within the economy that corresponds to each of the expenditure items, namely:

1. accommodation
2. food and beverage service activities
3. transport (land, water, and air transport)
4. professional, scientific, and technical activities; administrative and support service activities
5. arts, entertainment, and recreation

Energy Consumption of Tourism from the use of Petroleum and other fuel products in liters

$$\underset{\text{Petroleum}}{EC_t} = \frac{1}{P\_petroleum_t} \left\{ \sum_{i=j=1}^{5} \left[(TE_{i,t}) \cdot (TC\_petroleum_{j,2018}) \right] \right\}$$

where:

i refers to the expenditure items, namely:

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

and,

j refers to the industries within the economy that corresponds to each of the expenditure items, namely:

1. accommodation
2. food and beverage service activities
3. transport (land, water, and air transport)
4. professional, scientific, and technical activities; administrative and support service activities
5. arts, entertainment, and recreation

Energy Consumption of Tourism in Kilotonnes of Oil Equivalent (KTOE)

The energy consumption from the use of electricity in KWh and from the use of petroleum and other fuel products in liters will be converted to KTOE using conversion factors.

Carbon Dioxide (CO_2) Emissions of Tourism

The CO_2 emission is derived from the computed energy consumption from the use of Electricity and Petroleum and other fuel products following the steps described in Greenhouse Gases Equivalencies

Calculator – Calculations and References of the United States Environmental Protection Agency (EPA).

Consumption of the Economy

The overall water consumption and energy consumption from the use of Electricity and Petroleum and other fuel products, including the resulting CO_2 emission, of the economy is derived using specific Gross Outputs (GOs) from NAP, with the assumption that the total water, electricity, and coke and refined petroleum products produced in the economy for the year is equal to the consumption of the economy.

The overall water consumption of the economy is derived by dividing the GO of Water supply sub-industry from NAP at current prices by the average retail price of water per cubic meter.

Meanwhile, the overall energy consumption of the economy from the use of electricity and petroleum and other fuel products is derived by dividing the GO of Electricity and of Manufacture of coke and refined petroleum products sub-industries from NAP at current prices by the average retail price of electricity per kilowatt-hour and of petroleum per liter, respectively. The derived energy consumption of the economy from the use of electricity in KWh and from the use of petroleum and other fuel products in liters are converted to KTOE using conversion factors.

Finally, the CO_2 emission of the economy is derived from the computed overall energy consumption of the economy from the use of Electricity and Petroleum and other fuel products following the steps described in Greenhouse Gases Equivalencies Calculator – Calculations and References of the US EPA.

III.2. MST Tables

The following are the available tables:

Table 1 Consumption of Inbound Tourism	Presents the water consumption, energy consumption from the use of electricity and petroleum and other fuel products, and CO_2 emission resulting from the use of electricity and petroleum

	and other fuel products of non-resident visitors within the Philippines
Table 2 Consumption of Domestic Tourism	Presents the water consumption, energy consumption from the use of electricity and petroleum and other fuel products, and CO_2 emission resulting from the use of electricity and petroleum and other fuel products of resident visitors within the Philippines
Table 3 Consumption of Tourism (Inbound and Domestic Tourism)	Presents the total water consumption, total energy consumption from the use of electricity and petroleum and other fuel products, and total CO_2 emission resulting from the use of electricity and petroleum and other fuel products of resident and non-resident visitors within the Philippines
Table 4 Share of Tourism Consumption to the Total Consumption of the Economy	Presents the share of the tourism's water consumption, energy consumption from the use of electricity and petroleum and other fuel products, and CO_2 emission resulting from energy use to the overall water and energy consumption and CO_2 emission of the economy.

III.3. Sources of Revision

The 2019 and 2020 revision of MST was due to the availability of the revised 2019 and 2020 PTSA.

IV. Concepts and Definition of Terms

The SF-MST being developed will serve as an organizing structure that provides a common understanding of concepts, definitions, and related terminology and will bring together different data sources to provide a consistent and coherent picture of sustainable tourism over time that are comparable across different destinations and countries. The SF-MST covers the three (3) primary dimensions of sustainability — economic, environmental, and social.

Three Dimensions of Sustainability

The *economic dimension* covers the production and consumption associated with tourism activity in terms of associated goods and services. This will commonly be reflected in measures such as visitor consumption and the output of tourism industries. The economic dimension also includes description of the characteristics and the production processes of tourism industries. It thus captures investments in produced capital (hotels, transport infrastructure, etc.); employment in tourism and human capital (including skills and experience); and information on the size, industry class and ownership of tourism establishments (SF-MST, pp. 19).

The *environmental dimension* concerns the stocks and changes in stock of environmental assets, often referred to as natural capital, that support tourism activity through the provision of ecosystem services or are affected by tourism activity. Natural capital includes land, beaches, coastal and marine areas, national parks, rivers, etc. As well, the environmental dimension incorporates measurement of the flows of natural inputs to tourism production processes, such as flows of water and energy, and the flows of residuals that are generated from tourism production and consumption including GHG emissions, solid waste, wastewater and other pollutants (SF-MST, pp. 19-20).

The *social dimension* covers a range of social aspects related to tourism activity. It includes the local, traditional and indigenous cultural aspects that can support tourism activity or may be impacted by tourism. It also includes the outcomes of tourism production processes in terms of the provision of decent work and occupational health and safety (and hence links to employment); the contribution to individual and community health and well-being; performance in relation to gender equality, income equality and other aspects of equality; and the development of social capital reflected in the strength of community networks and institutional arrangements (SF-MST, pp. 20).

Forms of Tourism covered in MST

Domestic tourism, which comprises the activities of a resident visitor within the country of reference, either as part of a domestic tourism trip or part of an outbound tourism trip (IRTS 2008, para. 2.39a).

Inbound tourism comprises the activities of a non-resident visitor within the country of reference on an inbound tourism trip (IRTS 2008, para. 2.39b).

Other relevant TSA concepts

Tourism expenditure is the amount paid for the acquisition of consumption goods and services as well as valuables, for own use or to give away, for and during tourism trips. It includes expenditures by visitors themselves as well as expenses that are paid for or reimbursed by others (IRTS 2008, para. 2.21)

Tourism consumption has the same formal definition as tourism expenditure. Nevertheless, the concept of tourism consumption used in the TSA goes beyond that of tourism expenditure. Actually, besides "the amount paid for the acquisition of consumption goods and services, as well as valuables for own use or to give away, for and during tourism trips" that corresponds to monetary transactions (the focus of tourism expenditure), it also includes services associated with vacation accommodation on own account, tourism social transfers in kind and other imputed consumption. (IRTS 2008, para. 2.25)

Tourism characteristic goods and services refer to products that are typical for tourism, which in the absence of visitors, in most countries would probably cease to exist in meaningful quantity or for which the level of consumption would be significantly reduced and for which it seems possible to obtain statistical information (IRTS 2008, para. 5.10).

Tourism characteristic activities are the activities that typically produce tourism characteristic products (IRTS 2008, para. 5.11).

V. Dissemination of Results and Revision

The schedule of release of MST is seven (7) months after the reference year. Press release, statistical tables, social cards, and infographics are posted on the PSA website.

VI. Citation

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VII. Contact Information

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