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LINKING THE ACCOUNTING FRAMEWORKS OF THE SEEA AND THE TSA

Draft outline for a Technical Note

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1. Introduction

This paper provides a draft outline for a Technical Note that describes the linkages between the accounting frameworks of the System of Environmental-Economic Accounting (SEEA) and the Tourism Satellite Account (TSA). The outline also covers the description of possible core environmental-economic accounts for the measurement of sustainable tourism concerning the use of water and energy and the generation of GHG emissions and solid waste. Finally, the outline describes links to advice concerning the compilation of these accounts and potential extensions in this area of measurement.

The intent in drafting the Technical Note is to provide information to enable countries to commence the development of accounts that are relevant to assessing sustainable tourism, particularly in the context of reporting on the UN SDGs.

At the same time, the work included in the Technical Note is being undertaken in the context of the UN World Tourism Organization (UNWTO) project: Towards a Statistical Framework for Measuring Sustainable Tourism (MST). The linking of the environmental and economic dimensions of tourism activity is the initial focus in the development of a broader statistical framework for the measurement of sustainable tourism.

The development of a Technical Note was endorsed by the UN Committee of Experts on Environmental-Economic Accounting (UNCREEA) at its June 2016 meeting and supported by the Working Group of Experts on MST at its October 2016 meeting.

This Technical Note follows the general structure that has been developed for other topics in the context of the SEEA, i.e. the description of core accounts, indicators and general compilation guidance. SEEA Technical Notes have been developed or are under development for water, energy, air emissions and land.

However, the approach in this note is somewhat different from other Technical Notes in that the underlying conceptual framework describing all relevant treatments concerning the linkages between SEEA and TSA has not yet been drafted. Thus this document provides a “first cut” of relevant accounts and tables with a focus on broad structures and related indicators.

This Technical Note also differs in covering accounts and material from a range of SEEA components including water, energy and air emissions. It is not intended that the technical detail and other material already available on these components is summarized or repeated here but rather references/links should be made and any relevant extensions or adaptations for integration with tourism should be described.

It is hoped that this draft outline can provide the basis for ongoing technical discussion and also provide a starting point for measurement testing in this area, conceivably through the development of MST pilot studies in countries¹. All comments and suggestions would be welcome.

2. Proposed Outline for the Technical Note on linking SEEA and TSA

Chapter 1: Introduction

This chapter would cover

- Motivation for linking SEEA and TSA
 - Measuring Sustainable Tourism (MST) project
 - Sustainable tourism / sustainable development / SDGs
 - Specific policy topics (e.g. water use, climate change, etc)
- Statistical context
 - Brief history of SEEA and TSA frameworks and links to the System of National Accounts (SNA)
 - Existing SEEA Technical Notes (e.g. for water and energy)
 - Overview of past work linking SEEA and TSA (Canada, Italy, others, text included in SEEA Applications and Extensions)

Chapter 2: Integrating the SEEA and TSA frameworks

This chapter would cover

- Key features of the TSA
 - Scope of tourism – tourism activity, characteristic industries and products
 - Types of accounts
- Overview of the SEEA accounts
 - Physical flow accounts
 - Environmental asset accounts
 - Environmental activity accounts
 - Ecosystem accounts
 - Combined presentations
- Avenues towards integration
 - Connecting SEEA physical flow accounts and tourism activity
 - Assessing the environmental asset base for tourism activity

¹ See *Designing Pilot Studies*, Discussion Paper #5 presented at the Meeting of the Working Group of Experts on 20-21 October 2016: http://cf.cdn.unwto.org/sites/all/files/pdf/mst_issue_paper_5.pdf

- Connecting sustainable tourism and ecosystem accounting

NB: Discussion in these sub-sections will describe specific conceptual challenges of integration (i) accounting for the demand perspective of tourism; and (ii) considering the spatial dimensions within a statistical framework setting.

Chapter 3: Initial core accounts for tourism businesses

This chapter would cover

- Introduction to core accounts and their role
- Description of core accounts for tourism industries (initial drafts of the following accounts are presented in the following section of this paper)
 - Water
 - Energy
 - GHG emissions
 - Solid waste

NB: Aside from presenting the accounts, the discussion here will not repeat equivalent discussion in associated SEEA technical notes (e.g. for water) where the relevant accounting entries are described (recognizing also the material available in the associated SEEA standards). Instead references to the relevant material will be provided and the focus will be on describing required extensions or adaptations.

- Defining environmental flows (natural inputs such as water and energy and residuals such as emissions, wastewater, solid waste) with respect to tourism
- Methods for the estimation of tourism share of environmental flows
- Treatment of environmental flows concerning international transport

Chapter 4: Combined presentations and indicators

This chapter would cover

- Description of a combined presentation for tourism businesses

NB: Combined presentations are described in Chapter 6 of the SEEA Central Framework. They are structured tables that present a range of information on a particular topic (e.g. tourism industries) covering data in physical terms and in monetary terms but using common classifications as appropriate.

- Indicators of sustainable tourism
 - For SDG reporting
 - For destination level analysis

Chapter 5: Compilation and measurement

This chapter would cover

- Introduction to steps of the Generic Statistics Business Process Model (GSBMP)
 - Specify needs; Design and build; Collect and process; Analyse; Disseminate; Evaluate
- Reference to specific guidance on compilation in other SEEA Technical Notes for water, energy, air emissions and solid waste
- Description of additional considerations to incorporate a focus on tourism industries, including
 - Industry and product detail
 - Spatial detail

- Links to other statistical guidance and work including:
 - International Recommendations for Tourism Statistics Compilation Guide
 - TSA Compilation Guide
 - Framework for the Development of Environmental Statistics

Chapter 6: Extensions and further development

This chapter would cover

- Potential extensions to incorporate additional information from the SEEA framework with respect to tourism activity
 - Environmental activity and transactions
 - Land and other environmental assets
 - Ecosystem accounting
- Planned development of the broader MST statistical framework
 - Extended TSA specific analysis
 - Linkages to social and cultural dimensions
- Extended analysis
 - Environmentally-extended I-O tables for tourism
- Proposed next steps and research agenda

Chapter 7: References and links

3. Initial core environmental-economic accounts for sustainable tourism

Determining the focus of the initial core accounts

The accounting framework of the SEEA includes accounts across a wide range of environmental stocks and flows. The SEEA Central Framework records information on individual environmental stocks and flows such as mineral resources, land, soil, water, timber, energy, GHG emissions and solid waste. It accounts for these stocks and flows in either (i) asset accounts, where stocks of environmental assets and changes in these stocks are measured over an accounting period; or (ii) physical flow accounts where the interactions between the environment and the economy are recorded.

The SEEA Experimental Ecosystem Accounting (SEEA EEA), on the other hand, records information on environmental stocks and flows as they co-exist within a local area, i.e. within an ecosystem. The focus is thus on understanding how local ecosystems are changing over time and whether the capacity of these ecosystems to provide benefits to society is changing.

While tourism activity depends, in many instances, on the use of the natural environment (e.g. beaches, reefs, forests, etc), tourism is not a primary user of individual environmental stocks such as minerals, timber and fish. Consequently, there is less direct interest for MST in considering changes in these types of natural resources.

The main focus in understanding the connections between tourism activity and the environment by means of a statistical framework thus lies in recording

- the use of environmental flows, such as water and energy, in tourism activity
- the generation of environmental flows, such as GHG emissions, solid waste, wastewater and other pollutants, by tourism activity
- the changing condition of individual environmental assets, that provide flows used in tourism activity, e.g. water resource stocks, as well as the condition of ecosystems providing services to tourists, e.g. national parks, beaches.

The types of accounts that are required for the first two categories of environmental flows follow the general structure of the standard physical flow accounts of the SEEA Central Framework, Chapter III, with additional industry detail to highlight tourism activity. At this stage in the articulation of the link between the SEEA and the measurement of sustainable tourism the intended focus is on the connections with environmental flows. The initial core accounts therefore relate to accountings for flows of water, energy, GHG emissions and solid waste in the context of tourism activity.

Physical flow accounts highlighting tourism characteristic industries

The most straightforward connection between SEEA and tourism activity is through compiling physical flow accounts that highlight the flows for tourism characteristic activities. Tourism characteristic activities are the activities that typically produce tourism characteristic products. Tourism characteristic products are those that satisfy one or both of the following criteria: (a) tourism expenditure on the product should represent a significant share of total tourism expenditure (share-of-expenditure/demand condition); (b) tourism expenditure on the product should represent a significant share of the supply of the product in the economy (share-of-supply condition)². There are twelve categories of tourism characteristic activities. Categories 1 through 10 comprise the core categories for international comparability purposes. The remaining two categories are country specific: category 11, covering retail trade of goods that may be relevant in the country; category 12, covering other tourism characteristic activities producing services that are country-specific.

The SEEA presents a range of physical flow accounts, the primary ones concerning energy flows, water flows (including wastewater), air emissions (including GHG emissions), solid waste and emissions to water. All of these topics may be of interest in the context of assessing sustainable tourism. Compilation of a series of these accounts would help to inform discussion of, for example, energy use efficiency, water use efficiency, greenhouse gas emissions, and flows of solid waste by tourism characteristic industries.

Importantly, by recording these environmental flows for tourism characteristic industries within the SEEA framework, the estimates are reconciled to the whole economy flows rather than considering stand alone estimates of, for example, water use. This improves data quality and data coherence but also supports comparison and benchmarking between tourism industries and other industries.

Examples of potential structures of core accounts for water use, energy use, GHG emissions and solid waste are shown in the following four tables. For simplification of these accounts, five tourism characteristic activities are shown³ but more detailed presentations could be used. The same ideas as presented here can be extended to accounting for other physical flows by adapting the corresponding accounts from the SEEA Central Framework.

Also, the tables have been somewhat simplified for demonstration purposes compared to the standard tables in the SEEA Central Framework. Thus, a more simplified set of flows has been presented representing those considered to be of most relevance to tourism activities. The tables in the SEEA Central Framework needed to be developed such that the accounts could be of relevance to all activities. Through discussion of the appropriate detail, the most appropriate accounts to suit the measurement of sustainable tourism will be developed while retaining consistency with the classifications and structures of the SEEA Central Framework.

These tables reflect a production or supply perspective and hence do not require changes to the conceptual framework for physical flow accounts outlined in the SEEA Central Framework. The largest challenge in compiling accounts like these will be collecting (or otherwise deriving) data on the different physical flows for the specific tourism activities.

At this stage, a description of the entries in the different tables has not been developed pending feedback on the coverage and focus of measurement. Descriptions of the various entries and definition of terms are provided in the SEEA Central Framework, Chapter 3 (http://unstats.un.org/unsd/envaccounting/seeaRev/SEEA_CF_Final_en.pdf). It is noted that it is not expected that all cells in the tables would contain data, i.e. some combinations of activities and flows will be more likely to occur.

² See IRTS paras 5.8-5.11 & 5.18.

³ All types of passenger transport (rail, road, water and air) are grouped together, and cultural and sports and recreational activities are also grouped together.

Table 1: Physical flow account for water for tourism characteristic activities

Physical supply table for water															
Abstraction of water; Production of water; Generation of return flows															
	Tourism characteristic activities						Water collection, treatment and supply	Sewerage	Other industries	Households	Flows from the rest of the world Imports	Flows from the environment	Total supply		
	Accomm odation	Food & beverage	Transport	Culture & Recreation	Other	Total									
(I) Sources of abstracted water															
Inland water resources															
Other water sources															
Total abstracted water															
(II) Abstracted water															
For distribution															
For own-use															
(III) Wastewater generated															
(IV) Return flows of water															
(V) Evaporation of abstracted water, transpiration and water incorporated into products															
Total supply															
Physical use table for water															
Abstraction of water; Intermediate consumption; Return flows															
	Tourism characteristic activities						Water collection, treatment and supply	Sewerage	Other industries	Households	Final consumption	Accumulation	Flows to the rest of the world Exports	Flows to the environment	Total use
	Accomm odation	Food & beverage	Transport	Culture & Recreation	Other	Total									
(I) Sources of abstracted water															
Inland water resources															
Other water sources															
Total use abstracted water															
(II) Abstracted water															
Distributed water															
Own use															
(III) Wastewater															
(IV) Return flows of water															
(V) Evaporation of abstracted water, transpiration and water incorporated into products															
Total															
Total use															

Table 2: Physical flow account for energy for tourism characteristic activities (joules: net calorific units)

Physical supply table for energy		Production (including household production on own-account); Generation of residuals						Accumulation	Flows from the Rest of the world Imports	Flows from the environment	TOTAL SUPPLY	
		Tourism characteristic activities										Other Industries
		Accommodation	Food & beverage	Transport	Culture & recreation	Other	TOTAL	incl Electricity				
A. Energy resources												
Natural resource inputs												
Mineral and energy resources												
Timber resources												
Inputs of energy from renewable sources												
Solar												
Hydro												
Wind												
Other natural inputs												
B. Energy products												
Production of energy products by SIEC class												
Natural gas												
Oil												
Biofuels												
Electricity												
Other fuels												
Total												
C1. Energy residuals												
Total losses and other energy residuals												
C2. Other residual flows												
TOTAL SUPPLY												
Physical use table for energy		Intermediate consumption; Use of energy resources; Receipt of energy losses						Final consumption	Accumulation	Flows to the Rest of the world Exports	Flows to the environment	TOTAL USE
		Tourism characteristic activities										
		Accommodation	Food & beverage	Transport	Culture & recreation	Other	TOTAL	incl Electricity				
D. Energy resources												
Natural resource inputs												
Mineral and energy resources												
Timber resources												
Inputs of energy from renewable sources												
Solar												
Hydro												
Wind												
Other natural inputs												
E. Energy products												
Transformation of energy products by SIEC class												
End-use of energy products by SIEC class												
Natural gas												
Oil												
Biofuels												
Electricity												
Other fuels												
Total end-use for energy purposes												
End-use for non-energy purposes												
F1. Energy residuals												
F2. Other residual flows												
TOTAL USE												

Table 3: Physical flow account for GHG emissions for tourism characteristic activities

	Supply table for air emissions							Total supply of emissions	Use table for air emissions		
	Generation of emissions								Accumulation	Flows to the Environment	Total use of emissions
	Tourism characteristic activities						Other industries				
Type of substance	Accommodation	Food & beverage	Transport	Culture & Recreation	Other	Total			Emissions released to the environment		
Carbon dioxide											
Methane											
Dinitrogen oxide											
Nitrous oxides											

Table 4: Physical flow account for solid waste for tourism characteristic activities (mass units – kilograms / tonnes)

Physical supply table for solid waste										Flows with the rest of the world	Flows from the environment	Total supply	
Generation of solid waste										Imports of solid waste	Recovered residuals (recycling/recuperat ie)		
Tourism characteristic activities							Other industries	Households					
	Accommodation	Food & beverage	Transport	Culture & recreation	Other	TOTAL							
A. Generation of solid waste residuals													
	Metallic waste												
	Other recyclables												
	Discarded equipment and vehicles												
	Mixed residential and commercial wastes												
	Other wastes												
B. Generation of solid waste products													
	Metallic waste												
	Other recyclables												
	Discarded equipment and vehicles												
	Mixed residential and commercial wastes												
	Other wastes												
Physical use table for solid waste													
Intermediate consumption; Collection of residuals										Final consumption	Rest of the world	Flows to the Environment	Total use
Waste collection, treatment and disposal industry							Tourism activities	Other industries	Households	Exports of solid waste			
	Landfill	Incineration	Of which: Incineration to generate energy	Recycling and reuse	Other treatment								
		Total											
C. Collection and disposal of solid waste residuals													
	Metallic waste												
	Other recyclables												
	Discarded equipment and vehicles												
	Mixed residential and commercial wastes												
	Other wastes												
D. Use of solid waste products													
	Metallic waste												
	Other recyclables												
	Discarded equipment and vehicles												
	Mixed residential and commercial wastes												
	Other wastes												

Potential accounting issues to be considered in compiling the proposed core accounts

The following accounting issues are the subject of ongoing research and discussion and will be important to clarify to provide appropriate advice to the compilers of accounts in these areas. First, due to the production perspective followed in each of these accounts, the aggregate physical flows across tourism characteristic industries shown in these tables would overstate the direct contribution of tourism activity since some proportion of the flows recorded for each industry would relate to non-tourism activity within those industries. For example, not all of the water used by the food and beverage industry will relate to tourism activity. On the other hand, there may be flows relating to non-tourism industries that are part of the provision of products to visitors that might ideally be included in an aggregate measure of environmental flows for tourism activity. The potential options for allocation environmental flows to tourism activity are discussed in a technical paper presented to the Committee meeting.

Second, for some physical flows, particularly water, it is likely to be particularly important to understand the sub-annual and seasonal patterns. In most locations, tourist activity will peak at certain times of the year and the sustainability of tourism activity will require an understanding of whether the peak demand can be satisfied given expected patterns of supply of natural resources, which may also be affected by seasonal variation. It is also likely to be appropriate in certain cases, again including water, to understand the spatial distribution of flows within a country. The development of the MST statistical framework will consider appropriate means by which sub-annual and sub-national information can be incorporated.

Third, the focus on tourism industries may be complemented by accounting for embodied environmental flows within tourism characteristic products. All products are outputs from production processes which are, at an aggregate level, reflected in standard supply and use tables. By using the information on the relationships between inputs and outputs of goods and services reflected in these tables, in principle it is possible to determine a link between the environmental flows of specific production processes and the outputs that are ultimately consumed. For example, it could be possible to estimate the quantity of energy embodied in the provision of accommodation services for visitors. The same logic can be applied for other environmental flows such as water and GHG emissions.

The techniques of attributing environmental flows to categories of final demand are well established and widely applied. The SEEA Applications and Extensions provides an introduction to the relevant approaches and associated literature in Chapter III and, in Chapter IV, it provides an example of applying this approach in relation to household consumption. It could be possible to use the principles outlined in SEEA Applications and Extensions to attribute environmental flows to tourism characteristic products, potentially using information on tourism expenditure also to differentiate this attribution by different types of visitor.

4. Conclusion

This draft outline is provided to introduce the concept of a technical note and provide a initial draft outline for a technical note covering environmental-economic accounts for sustainable tourism. This outline has been completed by a presentation of four core accounts for environmental flows that are of particular relevance in the analysis of sustainable tourism: i.e. accounts for water, energy, GHG emissions and solid waste.

Comments on the outline and the proposed initial core accounts from the Committee would be welcome.