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**WORKING GROUP OF EXPERTS  
ON MEASURING THE SUSTAINABILITY OF TOURISM**

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**THE DEMAND PERSPECTIVE  
IN MEASURING THE SUSTAINABILITY OF TOURISM  
WITH SPECIFIC FOCUS ON ENVIRONMENTAL  
ASPECTS**

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## **1. Introduction**

A crucial element of the project on measuring the sustainability of tourism (MST), going on at the World Tourism Organization (UNWTO) with the partnership of the United Nations Statistics Division (UNSD), is the development and implementation world-wide of standardized methods for developing statistics on the sustainability of tourism.

For the above purposes, a methodological document is under preparation which will provide the international reference for measuring the relevant phenomena, for the benefit of both official statistics and all statisticians as well as data users. A preliminary draft of the document - Statistical Framework for Measuring Sustainable Tourism, now renamed Statistical Framework for Measuring the Sustainability of Tourism (SF-MST) - was presented in June 2017 at the 6th International Conference on Tourism Statistics: Measuring Sustainable Tourism, Manila, Philippines. A subsequent draft, incorporating small extensions to the preliminary draft, was presented in February 2018 at the UNWTO Committee on Tourism Statistics and TSA at its 18th meeting, and the same draft was circulated for initial round of consultation with the UNWTO Committee and the Working

Group of Experts on Measuring the Sustainability of Tourism, while a revised version was planned for a global consultation in 2018. It is envisaged that the final version of the SF-MST will be submitted to the United Nations Statistical Commission in March in 2020.

For describing the role played by tourism in sustainable development, priority has been given to the option of following a systems approach, starting from the measurement of tourism as a sector of the economy. Designing such an approach is facilitated by the fact that international statistical frameworks are established and implemented within official statistics for the economy in general as well as for its interrelationships in particular with the natural environment. A similar wealth of references and measurement tools is not available, though, for interrelationships between the economic and the social dimensions of sustainable development. Thus the research work for the development of the SF-MST has initially been focused mainly on the measurement of tourism related environmental aspects.

The international statistical standards that are in place for the measurement of tourism activity and for the compilation of environmental-economic accounts are considered of utmost importance for the purposes of the SF-MST. Special attention is given to the International Recommendations for Tourism Statistics 2008 (IRTS 2008)<sup>1</sup>, the Tourism Satellite Account: Recommended Methodological Framework 2008 (TSA: RMF 2008), the System of Environmental-Economic Accounting 2012 - Central Framework (SEEA-CF)<sup>2</sup> and the System of Environmental-Economic Accounting 2012 - Experimental Ecosystem Accounting (SEEA-EEA)<sup>3</sup>.

The above publications are taken into consideration in an integrated way in the SF-MST. In particular, certain accounting schemes they provide are rearranged and suitably combined in the SF-MST in order to formulate guidelines for measuring the interrelationships between tourism and the natural environment.

The statistical data on tourism activity regularly produced according to the international recommendations reflects two distinct main perspectives mirroring the concept of demand and supply in economics. The two distinct standpoints differ in measurement scope and are focused on distinct though related aspects.

In the SF-MST, a focus on distinguishing these two main perspectives is included in Chapter 3 - "Accounting for the environmental dimension of sustainable tourism" - where it is suggested that initial estimates on environmental aspects for measuring the sustainability of tourism be undertaken applying first the supply perspective. That seems to respond, all considered, to feasibility reasons<sup>4</sup>. The demand perspective is not less important, though. Indeed, from a conceptual point of view this is the first perspective that one needs to understand and focus.

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<sup>1</sup> Starting from the IRTS 2008, more operational recommendations have been provided through the International Recommendations for Tourism Statistics 2008 Compilation Guide.

<sup>2</sup> The SEEA-CF is the international statistical standard for integrated environmental and economic accounting.

<sup>3</sup> Both tourism satellite accounts and environmental-economic accounts are "satellite" to the core system of national accounts. Both share fundamental concepts, definitions and classifications of national accounting in a way that they can be linked to the economy-wide national accounts and, furthermore, all three kinds of accounting can be linked to each other.

<sup>4</sup> That would be in line with availability of data obtainable from tourism satellite accounts and environmental-economic accounting.



Recognising the importance of both the above perspectives for measuring the sustainability of tourism activity, the present paper discusses the concept of the demand perspective in the SF-MST, which corresponds to that commonly mentioned in economic studies on tourism as the consumption perspective.

In addition to the way the demand perspective is understood in international statistical recommendations on tourism, the potential is discussed of a demand perspective extended beyond the boundaries of existing statistical standards to include in particular environmentally relevant phenomena triggered by visitor activities<sup>5</sup>. Reference is made to phenomena such as the use of resources like water and energy and the generation of GHG emissions and other residuals - key domains for measurement in the SF-MST<sup>6</sup> - as well as to impacts on ecosystems deriving from visitors' use of ecosystem services.

Discussing the measurement challenge from a demand perspective is particularly important with a view to develop statistical tools that ultimately can help to identify which policies focused on the demand side of tourism may be most effective to make the activity of visitors more aligned with sustainable development.

With regard to the relevance of the demand perspective, it is stressed throughout the paper that developing tourism statistics that are focused on such perspective or not should depend - as for all statistics - first on the interest of the user: investing on the development of data according to the demand perspective or the supply perspective should depend on the specific knowledge the user aims to achieve by using the different statistics.

In the following sections, after discussing the demand perspective as it stands in the international statistical standards for tourism (section 2), it is argued how to enlarge such perspective with a view to describe the ecological sustainability of visitor activity by integrating tourism statistics with data preferably obtained starting from statistical information on the environment included in SEEA-type accounts (section 3). The discussion is articulated distinguishing the use of products by visitors on the one hand and their activities beyond the use of products on the other; furthermore, also the attribution to the demand expressed by visitors of environmental flows generated by production processes along the whole supply chain activated by said demand is discussed as part of the demand perspective extended for the purposes of the SF-MST. A few concluding remarks resume main arguments discussed in previous sections for the purposes of possible discussion; also included are a few considerations suggesting the need of further reflection on aspects in some way linked to the demand perspective but not discussed in the present paper (section 4).

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<sup>5</sup> Social and cultural aspects are taken into account as well in the SF-MST, but organizing statistical information on phenomena in the social area strictly following a systems approach seems not that easy for the time being.

<sup>6</sup> Such phenomena are referred to as environmental flows in the SF-MST.

## 2. The demand perspective in the international statistical standards for tourism

The distinction made in the SF-MST between the demand perspective on the one hand and the supply perspective on the other reflects a similar distinction presented in the IRTS 2008 and the TSA: RMF 2008.

The demand perspective is presented in the IRTS 2008 in three chapters: Chapter 2, on basic concepts and definitions; Chapter 3, on visitors and tourism trips; Chapter 4, on tourism expenditure<sup>7</sup>. The same perspective is also the subject of Chapter 2 of the TSA: RMF 2008, "The demand perspective: concepts and definitions".

By definition the demand perspective is the starting point for addressing matters related to tourism. Any tourism phenomenon, in fact, originates from a demand that reflects needs of households and individuals moving away from their usual environments for tourism purposes. The supply of goods and services purchased by visitors takes place in response to such a demand.

Like for all tourism activities, for describing the activity of visitors the flows that are taken into account within official statistics are mainly direct ones<sup>8</sup>. As a consequence, similarly to the supply perspective, the demand resulting from visitors' decisions to undertake journeys which is described according to the international statistical standards for tourism is the one stemming from visitors decisions directly.

### 2.1 A rationale taken from economics

The rationale of having two fundamental perspectives in the international statistical standards for tourism, namely the demand and the supply perspective, reflects a peculiarity of economic analysis, where the final consumption perspective, in particular, is clearly distinguished.

In terms of economic statistics concepts, what is focused first is the final consumption directly related to trips taken by households and individuals, i.e. the demand appearing on the market as a direct consequence of all that visitors do for a trip or while on a trip, in brief that stems from the activity of visitors directly.

Starting from consideration of visitors' activities - which take place on the demand side of the economic system - one can then analyze productive activities serving visitors on the supply side. So, the boundaries of tourism as a functional sector are identified on the basis of the share of industries' supply that specifically meets the demand stemming from the

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<sup>7</sup> In the IRTS 2008 Compilation Guide, the demand perspective is presented in Chapter 2 ("The demand perspective: conceptual background and related observation issues"), Chapter 3 ("Measuring flows and characteristics of tourism trips and visitors"), Chapter 4 ("Measuring tourism expenditure"). In Chapter 5 ("Classifications relevant for tourism statistics") the demand perspective is reflected in the "Classification of products from a demand perspective".

<sup>8</sup> This is intended to facilitate many different potential uses of data for the purposes of various possible types of analysis. Just by starting from data on direct flows, in fact, researchers and decision makers can manage to obtain through specific elaborations the knowledge they aim for.

activity of visitors. In other words, the amount of output matching the share of final consumption stemming from the activity of visitors identifies the tourism sector in terms of shares of goods and services supplied<sup>9</sup>.

The demand side of tourism activity, as understood in economics, is one side of the coin, the other one being the supply side. The description of the two facets of the tourism economy is a key rationale to be followed in developing statistical information on tourism if a system approach is to be adopted. This is particularly so as concerns the TSA: RMF 2008, which is consistent with the IRTS 2008 and at the same time is aligned with the System of National Accounts 2008 (SNA 2008). In tourism satellite accounts the description of the demand side and that of the supply side are absolutely consistent with each other and with the description in national accounts of the whole economic system.

Both in the IRTS 2008 and the TSA: RMF 2008, at the core of the demand perspective there is the concept of tourism expenditure. In the TSA: RMF 2008, the concept of tourism consumption, which goes beyond that of tourism expenditure, is also crucial. What matters is the use by visitors of services and goods, mainly consumption goods<sup>10</sup>. As concerns tourism expenditure, the core concept is payments by visitors and other economic agents that are made in close connection with the purposes of visitor trips<sup>11</sup>.

## 2.2 Scope and articulation of official statistics on the activity of visitors

Economic territory and residence are basic concepts for tourism statistics. Depending on visitors' residence and the economic territory in which their activities take place, within the demand perspective three forms of tourism are distinguished: activities of resident visitors within the country of reference (Domestic tourism), activities of non-resident visitors within the country of reference (Inbound tourism) and activities of resident visitors outside the country of reference (Outbound tourism).

Accordingly, as concerns tourism consumption and tourism expenditure the following economic flows are measured within official statistics: Domestic tourism consumption, Inbound tourism consumption and Outbound tourism consumption, and Domestic tourism expenditure, Inbound tourism expenditure and Outbound tourism expenditure respectively.

For developing the above statistical information, while the IRTS 2008 is the general reference framework, the TSA: RMF 2008 is essential as concerns in particular the measurement of tourism consumption and, in general, in cases where the information requested can only be provided based on concepts from satellite accounting. Not

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<sup>9</sup> As it will be discussed later on, an enlarged concept of visitors' demand - going beyond that of final consumption of products - would include e.g. visitors' interest in enjoying natural sites with no transactions occurring on the market. Concerning the supply perspective, this is presented in the IRTS 2008 in Chapters 5 and 6, where the focus is on products and productive activities for tourism, the characterization of tourism industries, the measurement of the supply of services of tourism industries as well as the employment in the same industries. A more detailed and in-depth discussion on the supply perspective, centered on the rationale of the economic national accounts, is provided in the TSA: RMF 2008, Chapter 3; Chapter 4 therein presents specific accounts and aggregates in monetary and physical units describing the relevant phenomena either on the demand or the supply side.

<sup>10</sup> Also non-consumption goods such as valuables are taken into account, though less important quantitatively.

<sup>11</sup> One example of "other economic agents" is employers who make payments for the benefit of employees on business travel.

necessarily tourism satellite accounts need to be developed, instead, for obtaining proper estimates on tourism expenditure, for which definition and scope are the same in the IRTS 2008 and the TSA: RMF 2008.

In order to meet the demand of information on tourism expenditure - like for other information as well - it is a matter of a given country's choice whether one statistical tool or another one should be developed, namely "tourism statistics" or "tourism satellite accounts". The specific characteristics of the information requested is what matters, in fact, whereas the resources available for producing the data are, in turn, a possible limiting factor.

An overall picture of the demand perspective emerges by considering the set of basic data and indicators shown in Tables III.2 to III.4 of the IRTS 2008 Compilation Guide. The variables taken into account therein are indeed a selection of possible relevant statistics on inbound, domestic and outbound tourism and they are those deemed suitable for international comparison: included are statistics on inbound tourism concerning arrivals<sup>12</sup>, accommodation and expenditure<sup>13</sup>; statistics on domestic tourism concerning trips<sup>14</sup> and accommodation; and statistics on outbound tourism concerning departures<sup>15</sup> and expenditure<sup>16</sup>.

In terms of statistical information that can be derived from standard accounting tables, the demand perspective can be understood as encompassing a subset of the data that can be delivered based on the TSA: RMF 2008, namely the following aggregates included in Tables 1 to 4, 9 and 10: "Inbound tourism expenditure by products and classes of visitors" (Table 1), "Domestic tourism expenditure by products, classes of visitors and types of trips" (Table 2), "Outbound tourism expenditure by products, and classes of visitors" (Table 3), "Internal tourism consumption by products" (Table 4 - this aggregate is also reported in Table 6), "Tourism collective consumption by products and levels of government" (Table 9), and non-monetary indicators such as "Number of trips and overnights by forms of tourism and classes of visitors" and "Inbound tourism: number of arrivals and overnights by modes of transport" (Table 10).

It is noted that the picture of the demand perspective as suggested above by making reference to tables of the IRTS 2008 Compilation Guide and of the TSA: RMF 2008 is in terms of the relevant phenomena statistically observable, while the way these can be measured e.g. through questionnaires to visitors or to businesses, acting on the demand side and the supply side of tourism activity respectively, is a different matter not considered here.

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<sup>12</sup> A distinction between tourists and excursionists is recommended, as is a breakdown by origins of the trip in terms of regions of the world, main purposes, modes of transport and forms of organization of the trip.

<sup>13</sup> A breakdown by main purposes of the trip is recommended.

<sup>14</sup> A distinction between tourists and excursionists is recommended, as is a breakdown by main purposes, modes of transport and forms of organization of the trip.

<sup>15</sup> A distinction between tourists and excursionists is recommended.

<sup>16</sup> A breakdown by main purposes of the trip is recommended.



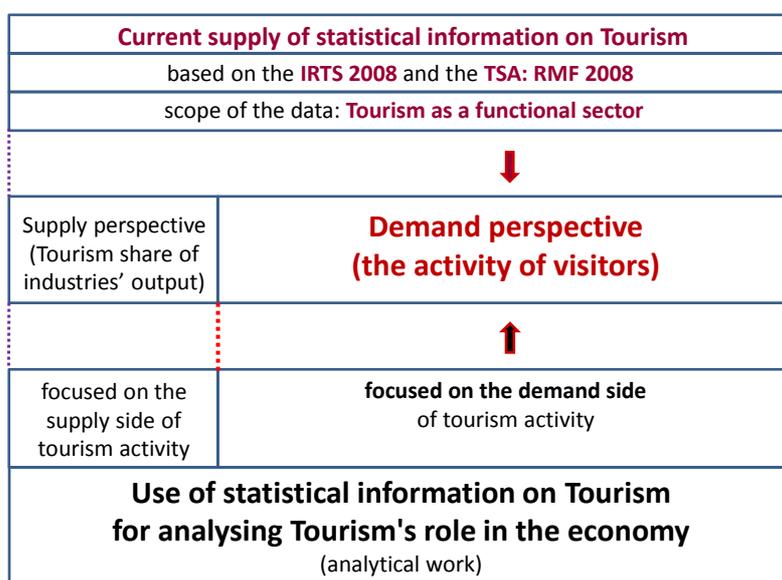
## 2.3 To develop statistics that meet data users' actual needs

An important remark concerns the attention to be given to what is the information actually required by users of statistical data in the different country situations.

As for all statistics, in describing the role played by tourism in the economy it is the demand for information that shall determine which set of data within the statistics potentially deliverable is actually relevant in a given situation, namely data on visitors' demand or on the supply by industries serving visitors. For instance, certain monetary aggregates among those in Tables 1 to 10 of the TSA: RMF 2008 are suitable, as highlighted above, to meet specific analytical questions focused on the demand side of tourism activity, while other data would be suitable if the focus were on the supply side.

In Figure 1, starting from the distinction made from an economic analysis standpoint between the demand side and the supply side of tourism related activities (bottom part of the figure), it is visualized how focusing on the demand perspective of the international statistical standards for tourism (upper part of the figure) should correspond to actual user needs. These may vary depending on circumstances in the different countries, and the crucial point is whether data users in a given country actually are particularly interested or not in exploring the demand side of the tourism economy.

**Figure 1. The focus on visitor activity as one of two possible perspectives underlying the provision of statistics suitable to meet data users' needs**



The development of statistics according to the supply perspective, on the other hand, should be privileged in countries where data users are mainly focused on the supply side of the tourism economy. In this case the interrelationships between the tourism sector and other productive activities is of particular interest, and the specific attention given to the supply perspective in the international recommendations essentially aims to ensure that a correct link is made between statistics on tourism productive activities and the rest of economic statistics, in particular national accounting data.

### 3. From existing international recommendations to the SF-MST

Within the international statistical standards for tourism currently in place, the issue of measuring the relationships between tourism and sustainability is explicitly mentioned in the IRTS 2008. In Chapter 8 of said publication it is envisaged, in particular, that environmental aspects be taken into account by estimating as first priority the links between tourism and the environment at the level of the national economy through an integration of tourism satellite accounts and environmental-economic accounts.

The discussion in the following sections is in a sense a follow up to the IRTS 2008 recommendation referred to above, with regard specifically to visitor activity.

#### 3.1 Extending the demand perspective to include environmental flows generated by the use of products by visitors

The demand perspective presented in the international statistical standards for tourism is focused, as previously noted, on direct flows. Accordingly, the measurement scope is visitors' consumption stemming directly from needs related to trips taken by households and individuals. Considering the activity of visitors also from an ecological sustainability point of view involves measuring, together with the final use of products by visitors, the direct impacts on the environment and on society from tourism consumption processes.

Extending in the SF-MST the measurement of tourism to include tourism related environmental aspects definitely implies going beyond the scope of the IRTS 2008 and the TSA: RMF 2008. Nevertheless, the main overarching concepts provided by these international statistical standards keep being essential in the SF-MST also when it comes to designing a range of statistics suitable to support analyses focused on environmental flows attributable to visitors in relation to their use of certain products, according to an understanding of the demand perspective enlarged compared to the international recommendations and recommended framework of 2008.

#### 3.2 Environmental flows generated directly by visitors' use of goods

The activity of visitors is characterized importantly by the use of services such as transport services, hotel accommodation and other accommodation facility services, plus the use of other services either purchased or not<sup>17</sup> which is worth to take into account as well. The use of goods, on the other side, is also an important part of visitor activity. Included are so-called tourism connected goods and non-tourism-related goods<sup>18</sup>.

A reflection concerning environmental flows caused by final use of goods is in the discussion paper "Options for allocating environmental flows to tourism through integration of data from tourism and environmental-economic accounts" presented at the UNWTO Committee on

<sup>17</sup> For example, imputed housing services provided by vacation homes on own account.

<sup>18</sup> In satellite accounting, generally speaking, the concept of "adapted product" is also relevant, but it has to do with products used by businesses as intermediate consumption in production processes; in principle, therefore, said concept applies only within the supply perspective.



Tourism Statistics and TSA at its 17th meeting in January 2017. The paper includes a focus on how to estimate, starting from available environmental-economic accounting estimates, certain environmental flows directly caused by visitors during their trips.

Concerning in particular the case of air emissions occurring when visitors drive cars on holiday, in the above paper it is suggested to attribute said emissions to visitors and to link estimates of such environmental flows to visitors' expenditure for the vehicle fuel that generates air pollutants when it is used for the car<sup>19</sup>. It is argued that the emissions at issue should be taken into account in addition to the similar ones attributed to industries serving visitors, which are associated to economic aggregates of the same industries, i.e. to tourism shares singled out from total output.

In fact, visitors driving cars on holiday do cause directly an amount of e.g. GHG emissions simply by driving, and at the same time industries that serve visitors by supplying tourism characteristic consumption products do cause other amounts of the same pollutants being emitted through production processes. This indicates that distinct amounts of same environmental flows are generated due to different processes, i.e. partially they are caused directly by visitors undertaking activity on their own-account - hence they occur on the demand side of tourism activity - and partially they are generated on the supply side by production processes. For a complete picture there is a need to account for both types of flows.

Further interesting examples of environmental flows generated as a direct consequence of the use of goods by visitors - which add to the above case of visitors driving cars on holiday - concern visitors staying with friends and relatives. In particular, GHG emissions caused by consumption of fuel for house heating for the benefit of visitors could be taken into account as well as visitors' use of energy products like electricity and abstracted water, which is relevant in relation to environmental assets such as energy and water resources respectively.

Measuring and linking economic and environmental flows for consumption processes like those mentioned here goes in the direction indicated in Chapter 8 of the IRTS 2008 in the same way as accounting for environmental flows generated by production processes of industries serving visitors. Such measurement is crucial within an extended demand perspective encompassing the environmental dimension of the sustainability of visitors' consumption.

### **3.3 Measuring environmental flows arising directly from visitors' use of goods through apportioning procedures applied to SEEA-CF estimates**

Tourism-related environmental flows caused at the stage of final use of certain goods could be assessed through apportioning procedures applied to environmental accounting estimates of environmental pressures to single out tourism shares.

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<sup>19</sup> The fuel at issue can be seen as a non-tourism-related good.

In principle this can be done by integrating the TSA: RMF 2008 and the SEEA-CF, possibly by linking data on tourism expenditure or other components of tourism consumption derived from tourism satellite accounts with proper estimates of environmental flows, elaborated starting from aggregates of environmental-economic accounts<sup>20</sup>. The use of the latter aggregates for the calculations would be particularly beneficial because such a source would allow proper linking of the relevant tourism and environmental statistical information, since in both cases data would be derived from satellite accounts, sharing therefore common basic concepts.

As already mentioned, the attribution of environmental flows to visitors resulting from calculations for apportioning SEEA-CF estimates should be registered in addition to environmental flows taken into account in relation to production processes.

The part of the SEEA-CF which provides methodological reference particularly relevant for the purposes of linking environmental information with data from tourism satellite accounts is Chapter 3: Physical flow accounts. Tables 3.4.1, 3.5.1 and 3.6.1 therein, or similar others adapted starting from them, are among those which most probably will be made available first in the majority of countries. In said tables a number of environmental flows are included which can meaningfully be associated to household expenditure - and therefore in part to visitor expenditure - as far as they can be traced to final use of products. Such linking of data within a demand perspective for the purposes of the SF-MST is possible because the SEEA-CF physical flow accounts share fundamental concepts, definitions and classifications with the core system of national accounts and hence with tourism satellite accounts.

Concerning the use of environmentally critical resources, the Physical supply and use table for energy (Table 3.4.1) includes e.g. the use of energy products for final consumption by households. By means of suitable statistical procedures, estimates of visitors' consumption of such products could be obtained starting from existing estimates of households' consumption of the same products. Examples of energy products potentially used directly by visitors are "oil products", "biofuels", "electricity" and "heat". As concerns the final consumption of distributed water, the amount used by households is accounted for in the Physical supply and use table for water (Table 3.5.1); starting from estimates derived from such type of accounting, the amount of distributed water used by visitors could in principle be estimated through apportioning calculations.

Turning to the generation of residuals, the Physical supply and use table for water includes among other things an assessment of wastewater generated by households, starting from which an algorithm could perhaps be devised in order to apportion such estimate to visitors staying with friends and relatives or at their own vacation homes<sup>21</sup>. A crucial case, given the importance of climate change policy issues, is air emissions, mentioned above with reference to the case of visitors driving cars on holiday; the amount of such residuals

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<sup>20</sup> Other components of tourism consumption include e.g. the value of services associated with vacation accommodation on own account. The use of these secondary dwellings, however, should be attributed entirely to visitors in cases where for the whole reference period the house is not rented to local people.

<sup>21</sup> What is argued here with reference to generation of residuals - and before with reference to use of resources - may apply e.g. to owner-occupied vacation homes. The generation of residuals by hotels and e.g. the use of energy products for heating them, instead, is taken into account within the supply perspective.

generated by households and released to the environment is accounted for in the Air emissions account (Table 3.6.1) and suitable procedures would have to be developed in order to calculate shares attributable to visitors.

As a remark concerning the above suggestion of using environmental information derived from standard environmental-economic accounts, it is noted that since the residence principle is adopted in such accounts, no data on environmental flows could be derived from them for linking to tourism consumption as concerns non-resident visitors. The impacts on the environment from inbound tourism consumption, therefore, could not be calculated in the way suggested above, which would be appropriate, instead, for domestic and outbound tourism consumption.

Statistical information on environmental pressures as concerns non-resident visitors could be provided, however, starting from information included in so-called bridge tables which statisticians may produce for reconciling environmental flow estimates calculated according to the residence principle or not. This is the case with air emission accounts, which e.g. in the European Statistical System are complemented with standardised bridge tables produced on a regular basis; such tables include data concerning emissions due to transport and heating activities.

### 3.4 Visitors' use of services

The use of services is an essential part of the activity of visitors. Such services are a share of all services supplied by industries serving visitors, which in turn are the output of production processes and at the same time the direct origin of environmental flows such as the environmental pressures that in the SF-MST are considered as key domains for measurement.

The fact that such environmental flows are actually generated at the stage of the production of the service determines the way they are accounted for in the SF-MST: since these flows are caused by industries serving visitors, not directly by visitors themselves, they are taken into account in the SF-MST within the supply perspective. The same applies to other environmental pressures such as impacts that industries serving visitors may directly exert on ecosystems. This accounting treatment is because the statistical framework is very much based on official statistics international recommendations, whose core rationale as concerns flows is in principle, as already stressed, to focus on direct flows.

The international statistical standards concerning both tourism and the environment, in fact, take into account direct flows. As concerns environmental flows, however, the possibility to attribute also indirect flows to final demand is envisaged by means of extensions and applications of the core accounts, not within the standard environmental-economic accounts<sup>22</sup>.

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<sup>22</sup> See e.g. para 3.3.3 Attribution of environmental flows to final demand in the System of Environmental-Economic Accounting 2012 - Applications and Extensions.

As concerns estimating tourism services' environmental pressures caused at the stage of their production, the calculation can be made following the so-called production approach. This consists in incorporating tourism as a specific set of industries in a special kind of environmental-economic accounts known as hybrid accounts; in other words, environmental flow accounts specific for tourism and elements of tourism satellite accounts are integrated in a single accounting framework<sup>23</sup>.

The use of services by visitors may impact directly also on the social sphere. Social aspects, however, are not discussed here since the focus is on environmental aspects, but it would be relevant to take them into account in an extended demand perspective.

### **3.5 Visitors' activities beyond the use of products**

In addition to using goods and services, the activity of visitors may also include other elements to be taken into account when it comes to the sustainability of tourism. To complement the points already discussed, what is also to be considered is that, for instance, certain natural sites can on their own provide benefits to visitors.

Enjoying such a type of destinations may be the main purpose of a trip, with possible implications from an ecological sustainability point of view. Also, in certain cases the main purpose of a trip may be enjoying a cultural or social experience, like e.g. in the case that an individual from a rich country travels to a very poor region in the world to bring help for the benefit of children, thus impacting on the social dimension of sustainable development. In cases like these, at the core of the trip's purpose there is something other than consumption of goods and services.

Considering the demand perspective as one including also the measurement of impacts on the environment or on society from visitors' activities like those exemplified above would be very useful in order to support analyses aimed at investigating how the demand from visitors including beyond the market may generate impacts on sustainable development.

### **3.6 Measuring impacts on the environment from visitors' activities beyond the use of products**

Data on activities of visitors who derive benefits from ecosystems directly - irrespective of the use of goods and services - and at the same time impact on the natural environment in doing that, could be integrated with proper statistical information concerning the ecosystems involved.

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<sup>23</sup> The production approach has been experimented in a number of pilot studies within the MST project. There is no evidence, so far, of equally structured experimental work focused on the demand perspective. Pilot studies based on the production approach were presented at the UNWTO Committee on Tourism Statistics and TSA at its 17th and 18th meetings, in January 2017 and February 2018 respectively. Experimental work had been developed by Statistics Canada, Istat and Statistics Netherlands and for all three countries it had been focused on the elaboration of estimates concerning the output of industries serving visitors and environmental pressures generated by the corresponding production processes. A brief summary report on pilot studies developed within the MST project is currently under preparation at UNWTO and it will serve both for implementation guidance and communication purposes.

In principle, information that can be derived starting from ecosystem accounting statistics could be particularly suitable for that purpose. The SEEA-EEA is the international reference for developing such statistics, though the status of its recommendations is not that of an international statistical standard yet.

In order to link to visitor activity the relevant statistical information obtainable from ecosystem accounts that may be developed based on the SEEA-EEA, it may or may not be necessary to apply apportioning procedures, differently from the case of SEEA-CF data for which such type of calculations is systematically needed.

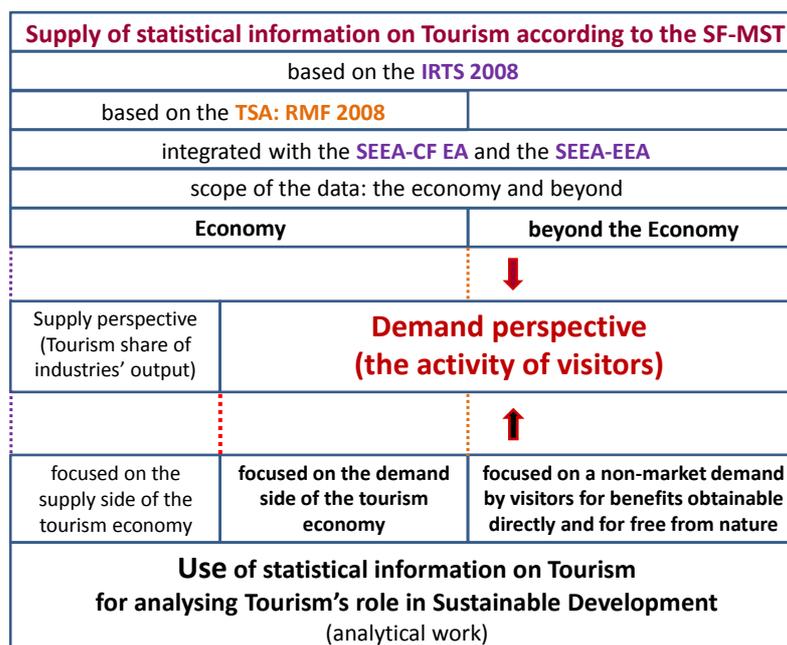
Unlike the case of data derived from standard environmental-economic accounts, furthermore, for most statistical information obtainable from ecosystem accounting there would be no impediment to linking it also to statistics on non-resident visitor activities. The description of phenomena essentially physical obtainable through such environmental information, in fact, would not be bound to the residence of economic agents, in particular in the case of geo-referenced data or certain statistics e.g. on ecosystem conditions.

### **3.7 3.7 Overview of a demand perspective that covers direct impacts on the natural environment from different types of visitors' activities**

Summarizing what has been argued so far, the demand perspective in the SF-MST is an enlarged perspective that results from extending the demand perspective concept taken from tourism statistics to cover direct impacts on the environment generated from different types of visitors' activities. The relevant statistical information includes data that can be obtained by integrating statistics on various types of visitors' activities with estimates of related environmental effects to be obtained preferably starting from standard environmental-economic accounts data and ecosystem accounting data. A comprehensive illustration of this is provided in Figure 2, resulting from an extension of the picture in Figure 1 on the demand perspective of the international statistical standards on tourism, based on the demand concept in economics.

The key intention in Figure 2 is to highlight the way a demand perspective conceived for the purposes of the SF-MST, like the one presented here, would go in practice beyond the economic dimension of the activity of visitors. A non obvious point suggested in the figure is that in the SF-MST a “non-market” request by visitors for spontaneous natural goods and ecosystem services obtainable directly and for free from the natural environment - together with related environmental impacts - should be part of the demand perspective in the same way as the demand expressed in the market by visitors.

**Figure 2. A demand perspective in the SF-MST that focuses on direct impacts on the environment from different types of visitors' activities**



### 3.8 Extending further the demand perspective by taking into account environmental flows caused by production processes along the whole supply chain activated by visitors' demand

The demand perspective has been discussed so far focusing on linking visitors' activities and environmental flows that are caused by such activities directly. As a matter of fact, describing direct flows is the general practice in main official statistics, as already noted, as far as both the supply and the demand sides of human activities are concerned.

The next step, in order to complement the picture of a demand perspective suitable for the purposes of the SF-MST, is to consider, in addition to the points discussed beforehand, the option of associating environmental flows caused by industries along the whole supply chain matching the demand by visitors entirely to this demand. This implies considering indirectly caused environmental flows, together with those caused by industries supplying services to visitors - discussed in section 3.4 - which are taken into account in the SF-MST first within the supply perspective.

The attribution of the above environmental flows to visitors' demand is in line with the discussion concerning applications and extensions of environmental-economic accounts included in the System of Environmental-Economic Accounting 2012 - Applications and Extensions (SEEA-AE)<sup>24</sup>. Chapter III therein in fact provides an introduction to widely

<sup>24</sup> See Chapter III, focused on analytical techniques, para. 3.3.3 Attribution of environmental pressures to final demand.

applied input-output analysis techniques that are suitable for linking environmental flows occurring along the whole supply chain concerning a given product to the final demand for the same product; mathematical details are provided as well.

The starting point for the elaborations at issue is the availability of supply and use tables. Such accounting schemes, in fact, provide a framework of the relationships, at an aggregate level, between inputs and outputs of goods and services, including also for industries that play a role in serving visitors even very much indirectly. This enables to link - starting from environmental information referred to industries obtainable from environmental accounts - environmental flows directly caused by businesses involved in the supply chain of a given product to the final demand for it, in particular the use of the same product by visitors.

With reference, for example, to accommodation services used by visitors in the reference period in a given country, one can calculate the total amount of resources such as water or energy which are used along the whole supply chain of the accommodation service that visitors ultimately are in a position to purchase just because certain intermediate consumption of those resources has taken place; all environmental flows at issue can then be linked to expenditures for accommodation by visitors. Similarly, other environmental flows occurring along the same supply chain and then attributable to visitors as well, such as e.g. GHG emissions, can be calculated and associated to the same expenditures<sup>25</sup>.

The approach proposed above reflects a general rationale according to which the real polluter is the final user of a given good or service also as concerns the pollution generated at the stage of the production of the same good or service. As concerns specifically final consumption by visitors, then, all environmental flows taken into account are thought as caused just from such final consumption, though in part indirectly as in the case of flows actually generated by processes occurring on the supply side of the economy, namely along the whole supply chain of products purchased by visitors. Given this rationale, the approach at issue is particularly suitable for providing the statistical basis to support analyses centred on the “polluter pays principle”.

#### 4. Concluding remarks

The main aim of the present paper is to contribute to reaching a common understanding about what the demand perspective should mean in terms of concepts and measurement boundaries in the SF-MST, with specific regard to linking the economic and environmental dimensions of sustainability for tourism.

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<sup>25</sup> In the above indirect attribution of environmental flows to visitors, the break-down by types of visitor of the available data on tourism expenditure could also be taken into account for a distinct attribution of the environmental flows at issue to tourists and to excursionists.

Whether statistics according to the demand perspective may turn out to be relevant depends on data users' needs, as the statistics at issue may or may not be priority ones according to circumstances in the different countries. What matters for determining if the demand perspective is appropriate is the tourism component of the interrelationships between tourism and the environment being focused by the user<sup>26</sup>.

One can provide useful information according to the demand perspective on the sustainability of tourism by delivering e.g. estimates concerning tourism expenditure together with estimates describing environmental flows caused directly or even indirectly by visitor activities measured through that expenditure, as well as data measuring visitor activities beyond the use of products plus direct effects on the environment stemming from the same activities.

The demand perspective presented in the previous sections reflects the orientation in the SF-MST of following a systems perspective, having an accounting-based approach as crucial element underlying the conceptual structure of the statistical framework. Such an approach suggests in particular, through statistical accounting tools specific for tourism and the environment, potential accounting schemes suitable for an integrated description of economic phenomena and related environmental aspects with regard to tourism.

The distinct steps taken into account in articulating the demand perspective reflect in particular the fact that for several reasons it is believed that environmental aspects related to visitor activities would have to be described preferably by identifying in available environmental accounting estimates parts that can be attributed to visitors through appropriate linking with tourism satellite accounts. Said steps are inspired by the SEEA rationale and are tailored on the type of data that actually can be derived from SEEA accounts.

With a view to properly developing the reasoning, a number of distinctions have been made, reflecting accounting concepts in general and the accounting approach followed in the SF-MST. Given the accounting treatment of environmental flows in the SEEA-CF, the use of services and the use of goods by visitors have been distinguished. One main distinction is that between environmental flows caused by visitors through the use of products from other environmental impacts stemming from visitor activities through which visitors get benefits from ecosystems directly, dealt with in the SEEA-EEA. Another crucial distinction is the one between direct and indirect environmental consequences of visitor activities, which is fundamental from a statistical point of view in general.

The approach of discussing environmental aspects separately in relation to the use of certain goods by visitors, to activities of the latter beyond the use of products and to the option of attributing entirely to visitors environmental flows caused by all production processes activated even indirectly by tourism demand, is ultimately intended to help provide a sound conceptual framework for suitably tackling complexity when it comes to the demand perspective in the ST-MST.

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<sup>26</sup> If the focus in data users' analytical work is on visitor activities and related impacts on the environment, the demand perspective in the SF-MST turns out to be the appropriate one.



Sticking to the accounting approach underpinning the international statistical frameworks, on tourism on the one hand and the interaction between economy and environment on the other, ensures strengths that derive from the application in the SF-MST of principles of national accounting. In general, using the national accounting rationale helps, as is widely recognized, to place all relevant statistics in appropriate context; furthermore, adopting the main overarching concepts of both statistical standards above is a way to best ensure conceptual consistency and comparability of assessments with regard to the economic and the environmental dimensions of sustainability with regard to tourism.

However, in addition, the residence principle embodied in data from tourism satellite accounts and SEEA-CF accounts may also cause some complication for the purposes of the SF-MST in the sense of making the need of data sources further articulated, as highlighted with reference to environmental flows generated directly by visitors' use of certain goods as far as non-resident visitors are concerned.

A further complication may stem from the fact as well that while in principle statistical information at the national scale based on the international statistical standards on tourism and the SEEA could be elaborated also at sub-national scales - as might be the case for data from tourism satellite accounts and SEEA accounts - in practice this most probably does not happen, at least in terms of trip destinations, which not always may correspond to territorial areas defined in a way to easily overlap with usual official statistics spatial references. If data on certain visitor activities' environmental impacts corresponding to specific destinations within a given country were not available, this would be a limitation for possible linking to the data on visitors under investigation, if available.

Given the importance of the destination aspect in the SF-MST, this suggests that integrating the TSA: RMF 2008 with the SEEA-CF and SEEA-EEA is crucial on a conceptual ground, but there might be a need to complement the information actually provided by means of accounting tools with further statistics focused on the activity of visitors at destination level and data suitable for describing the environmental consequences of such activity.

A final comment concerns social aspects, for which no discussion is developed in the present paper. Just to remark that visitor activities may impact remarkably on the social dimension of sustainability both in the destination territory and the usual environment of the visitor, which means in particular that visitor activities generate social impacts on visitors themselves. This seems to emphasize the importance of the demand perspective in measurement of sustainability with regard to tourism when the focus is on social aspects.