Annex 39. The INRouTe agenda and the UN Ecosystem Proposed Approach to Environmental Economic Accounting

Background

1. A number of relevant policy and conceptual developments have occurred since the original FDES was published in 1984: one of them has been the ecosystem approach.

   Please note the following paragraphs are part of the publication UNSD. (2014). Framework for the Development of Environment Statistics (FDES) 2013, United Nations Statistics Division.

2. The ecosystem approach was originally conceived as the strategic concept for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, as opposed to per individual parts of the systems. A more holistic approach, where parts interacting together constantly modify everything else, the ecosystem view integrally considers spatially defined units (basins, forest, marine, dry-land, etc.) at the local, national or global levels, applying appropriate scientific methodologies. (FDES 2013, para. B.30).

3. As a conceptual construct, this approach sets out to value and recognize ecosystem services that would otherwise not be explicitly acknowledged and accounted for. It is based on the application of appropriate scientific methodologies, focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes humans, with their cultural diversity, as an integral component of many ecosystems. As such, in principle it is realistic in promoting understanding of the environment and assessing the complex nature of interactions among the different components of the ecosystem. Delineation of the environment into spatially recognizable units that are influenced by associated seasonality and flora, along with physical data such as elevation, humidity and drainage. However, the focus of the ecosystem approach is designed to trigger management interventions, which must invariably be carried out in an economic and political context. Consequently, it has also attracted economic and political significance. (FDES 2013, para. B.34)

4. The ecosystem approach is therefore an important conceptual framework that can be used in environment statistics to model the structure and contents of the information to be produced by any given country or at any scale; the concept of "scalability" refers to the integration of information across different spatial scales with the aim of developing information sets for particular type of analysis at a level suitable for public policy purposes.

   As such, the ecosystem approach embodies a compelling logic to which the national and global statistical systems must respond and reverberate through the economic, social and political spheres to ensure legitimate planetary awareness. The ecosystem approach is therefore a significant input into the development of the FDES 2013. (FDES 2013. Para. B.35)

5. For the purposes of characterizing the ecosystems of a country, in the absence of an internationally agreed ecosystem classification, national classifications could be used and fully described for statistical purposes. Alternatively, the country could follow and adapt other internationally used ecosystem categories, such as the Millennium Ecosystem Assessment reporting categories. (FDES, 2013, para. 3.31)

6. Ecosystem categories are complicated to describe because of considerations of scale. Ecosystems can be alternatively grouped into biomes, bio-geographical regions, habitats, river basins/sub-basins, etc. Depending on the country, ecosystems and biomes can be subdivided into small homogenous units (in practice, land cover units which are homogenous considering provisioning ecosystem services) and broader spatial and statistical units reflecting socioecological systems. (FDES, 2013, para. 3.32).

7. Because of these challenging issues in relation to the measurement of ecosystem, the approval of the SEEA 2102 international standard opened the door to setting up an accounting framework coherent with the environmental accounting system identified as experimental.

8. This is precisely the focus and aim of the United Nations Statistics Division initiative proposing a first set of proposals and guidelines in order to start defining an experimental ecosystem accounting framework.

9. Please note the following paragraphs are inspired both in chapter 2 "Principles of ecosystem accounting" of UNSD. (2013). Revision of the System of Environmental-Economic Accounting (SEEA). SEEA Experimental Ecosystem Accounting: Consultation Draft. United Nations Statistics Division, as well as in the work carried on by INRouTe in relation with possible extensions of the proposed design of Regional Tourism Information System to sub-regional levels; it is at such territorial levels where the contribution of INRouTe to the SEEA ecosystem approach might be promising.

10. The SEEA Experimental Ecosystem Accounting has been developed within the broader process of revising the SEEA-2003 – a process initiated by the United Nations Statistical Commission (UNSC) in 2007. The primary objective of the SEEA revision process was the establishment of a statistical standard for environmental-economic accounting. At its 43rd meeting in February 2012, the UNSC adopted the SEEA Central Framework as an initial international statistical standard for environmental-economic accounting. The SEEA Central Framework is a multi-purpose, conceptual framework that describes interactions between the economy and the environment, and the stocks and changes in stocks of environmental assets. (SEEA_EEAv1 para 1.12).

11. During the SEEA revision process it became clear that there were some aspects of the SEEA2003 that could not be advanced and agreed to at the level of an internationally agreed standard. Consequently, these aspects, primarily relating to accounting for ecosystems and their degradation, were set-aside in the finalization of the SEEA Central Framework. (SEEA_EEAv1 para 1.13)

12. Ecosystem accounting is an approach to the assessment of the environment through the measurement of ecosystems, and measurement of the flows of services from ecosystems into economic and other human activity. Such measurement objectives should be consistent with the SEEA_CF although all of them should qualify as experimental exercises. (SEEA_EEAv1 para 1.1)

13. In fact, ecosystem accounting has a particular interest in linking standard measures of economic activity (provision of services) to encompass links to other human activity (such as recreational opportunities) in sub-national spatial areas. (SEEA_EEAv1 para 1.3)

14. Rather than focusing on the various individual environmental assets (e.g. timber resources, land, water resources), SEEA Experimental Ecosystem Accounting takes the perspective of ecosystems and, in effect, assesses how individual environmental assets interact as part of natural processes in a spatial area to provide a range of services for economic and other human activity. (SEEA_EEAv1 para 1.3)

15. The SEEA Central Framework consists of three broad areas of measurement (i) physical flows between the environment and the economy, (ii) the stocks of environmental assets and changes in these stocks; and (iii) economic activity and transactions related to the environment. The ecosystem accounting described in SEEA Experimental Ecosystem Accounting provides additional perspectives on measurement in these three areas. (SEEA_EEAv1 para 2.102)

16. First, SEEA Experimental Ecosystem Accounting extends the range of flows measured in physical and non-monetary terms. The focus in the SEEA Central Framework is on the flows of materials and energy that either enter the economy as natural inputs or return to the environment from the economy as residuals. Many of these flows are also included as part of the physical flows recorded in ecosystem accounting (e.g. flows of timber to the economy). In addition, SEEA Experimental Ecosystem Accounting includes measurement of the ecosystem services that are generated from ongoing ecosystem processes (such as the regulation of climate, air filtration and flood protection) and from human engagement with the environment (such as through recreation activity). (SEEA_EEAv1 para 2.103)

17. SEEA Experimental Ecosystem Accounting provides an initial basic conceptual framework to allow testing and experimentation that will in turn allow for an inter-disciplinary improved understanding and development of the accounting framework. (SEEA_EEAv1 para 1.7)

18. By taking a more holistic view, information organized following SEEA Experimental Ecosystem Accounting is able to provide an indication of impacts (both positive and negative) of economic and other human activity on the environment and can highlight the trade-offs between alternative uses of ecosystems. (SEEA_EEAv1 para 1.15)

19. For many environmental concerns the policy response is developed and implemented at a specific local level; since ecosystem accounting requires the development of spatially specific datasets it can form a basic tool for the assessment of integrated policy responses at that level of detail. But such datasets raise some issues related with the proper units to be used and the scalability of the information needed. (SEEA_EEAv1 para 1.21)

20. These issues include (i) determining the appropriate scale for analysis, (ii) defining the relationship between the delineation of spatial areas (and hence ecosystem assets) and the generation of ecosystem services since ecosystem services, particularly regulating services, which may be generated over spatial areas that cross ecosystem asset types; and (iii) connecting the spatial areas relevant for measuring the generation of ecosystem services with the location of beneficiaries of those services. (SEEA EEA TG 2.29)

21. Another role of the units model (see Units paragraph…) is to facilitate the up scaling and downscaling of information. Since so many different data are likely to be required from national level production data to site specific condition data, an important challenge in ecosystem accounting is the integration of information to a common scale, using scaling techniques, and then re-presentation of the data to the relevant level for aggregation and communication (SEEA EEA TG 2.30)

22. Because the allocation of economic activity to small spatial areas can be conceptually difficult, it may be most useful to commence with identification of measures of economic activity for those industries and activities for which a clear link can be established between an ecosystem and the location of the production; this is precisely the case of tourism.

23. Where links between economic units and particular ecosystems can be established, it is also possible to consider integrating information on a range of other transactions that may take place in relation to the economic activity.

For that to happen it is crucial that tourism datasets at subnational levels be geo-referrenced and include not just tourism data but also supplementary data in order to allow for linking measurement and analysis between tourism and ecosystems in specific territorial entities. Such geo-referenced databases would allow for scalability of the information needed in different sub-regional territorial levels.

24. This way, Tourism, a knowledge field created from a multidisciplinary perspective, is ready to give back to those disciplines that have contributed to its design as a knowledge and research area (mainly sociology, statistics, economy and geography). Giving back certain type of experiences and knowledge that might be useful as tourism measurement is strongly dependent on physical type of data (in fact, most of tourism basic statistical data and indicators are non-monetary).

25. For instance, Tourism can provide required information for the ecosystem proposed accounting structure in terms of organizing information on the environment from a spatial perspective describing, in a coherent manner, linkages between ecosystems and economic and other human activity.

26. More specifically, INRouTe already recommends an operational link between the concept of visitor/travel-party/household that could break the household sector information in order to explicitly identify the tourism connection to ecosystem services; also for international visitors population (see "Classification of ecosystem services")

27. From an accounting perspective ecological economics captures many relevant concepts including those relating to ecosystem capital and a flow of services. By using a broad conceptualization of services, ecological economics is able to consider trade-offs between the generation and use of different services in a more comprehensive fashion. Further, by considering the relationship between ecosystem capital and services flows, the potential for ecosystems to continue to provide services into the future becomes a direct point of analysis. Such analysis involves consideration of the carrying capacity of the environment. SEEA_EEA v1, para. 1.45).

28. As will be mention later on (Classification of ecosystem services) INRouTe can contribute to a more precise conceptualization of "Cultural services" as referred in the SEEA Ecosystem Accounting document at different levels.

Units

29. In order to undertake measurement of ecosystems in a co-ordinated way and to subsequently compare and analyze information across time and between ecosystems, there must be a clear focus for measurement. Boundaries for specific ecosystems are generally drawn on the basis of relative homogeneity of ecosystem characteristics, and in terms of having stronger internal functional relations than external ones[56]. However, these

[56]The general approach to identifying transactions related to a particular theme or topic is described in the SNA in its discussion of satellite accounts. A satellite account is formed through the adaptation and rearrangement of the core structures of the SNA to suit particular objectives. For the objective of identifying environmental transactions, the primary rearrangement is based on consideration of the purpose underlying each transaction and using so-called functional classifications. The compilation of accounts, known as functional accounts, using these alternative classifications requires that the underlying statistics also be capable of reorganization so as to provide the requisite information.
This is not exactly the case in tourism with the TSA; while the main purpose of the trip is basic in collecting tourism statistics, the accounting system used in the TSA refers to the ISIC and CPC classifications

boundaries are often gradual and diffuse and a definitive boundary between two ecosystems may be difficult to establish. Further, ecosystems may be very small or very large and operate at different spatial scales. (SEEA_EEA v1 para 2.40)

30. Statistical units are the entities about which information is sought and about which statistics are ultimately compiled. It is the unit that provides the basis for statistical aggregates and to which tabulated data refer. The statistical units of ecosystem accounting are spatial areas about which information is collected and statistics are compiled. (SEEA_EEA v1 para 2.41)

31. The units model consists of three different types of units: basic spatial units (BSU), land cover/ecosystem units (LCEU) and ecosystem accounting units (EAU). The following sub-sections describe each type of unit SEEA Application and Extension document refers to SEEA Experimental Ecosystem Accounting regarding geo-spatial analysis, the analytical relevance of the integration of environmental and economic information in geo-referenced datasets, as well as units model for spatial areas. No other SEEA complementary document focuses on sub-national levels (in fact, the SEEA Application and Extension document suggests that a "top down" approach is desirable and feasible regarding the presentation of environmental-economic accounts data by theme –in the case of tourism such assumption is far from being evident) (SEEA_EEA v1 para 2.42)

32. The delineation of units should be undertaken in concert with the development of spatial databases in Geographic Information Systems (GIS). (SEEA_EEA v1 para 2.68)

33. A basic spatial unit (BSU) is a small spatial area with a basic set of information. The most common starting point for this attribution process will be information on the location of the unit and land cover. This basic information is then extended with information relevant to the purpose of the account being compiled. (SEEA_EEA v1 para 2.43)

34. It should be recognized that since any given spatial area may generate a number of types of ecosystem services it is likely that a single BSU will be involved in the generation of a range of ecosystem services. In this sense there is no direct analogy between the BSU and an establishment in economic statistics that undertakes a single kind of activity. (SEEA_EEA v1 para 2.61)

35. The second type of unit is the land cover/ecosystem unit (LCEU). For most terrestrial areas an LCEU is defined as the set of contiguous BSU satisfying a pre-determined set of factors relating to the characteristics and operation of an ecosystem.

36. Following standard approaches to statistical classification, BSU would be classified to particular LCEU on the basis of a pre-dominance of characteristics within the BSU. This is akin to classifying an enterprise to a particular industry based on the pre-dominance of a particular economic activity in that enterprise. (SEEA_EEA v1 para 2.47)
37. At any point in time, all LCEU should be mutually exclusive, i.e. all BSU should be within only one LCEU. However, over time as changes in land cover and land use occur, some BSU will need to be re-classified to different LCEU. (SEEA_EEA v1 para 2.51)

38. It is likely that LCEU represent the closest approximation to ecosystems in spatial terms in the way that ecosystems are commonly envisaged. (SEEA_EEA v1 para 2.53)

Types of services

39. Based on the definitions of environmental activities, it is possible to define environmental goods and services and environmental producers. Environmental goods and services are different from ecosystem services. "Ecosystem services" is the term used to describe the contributions of ecosystems to benefits used in economic and other human activity (e.g., extracted natural resources, carbon sequestration and recreational opportunities (SEEA _CF, para. 4.31)

40. A fundamental aspect of ecosystem accounting is recognition that a single ecosystem will generate a range of ecosystem services thus contributing to the generation of a number of benefits. In some cases the ecosystem services may be produced "in tandem", such as when forest areas are preserved and provide air filtration services and opportunities for recreation and walking. In other cases the ecosystem services may be in competition, such as when forest areas are logged thus providing the benefits of timber but losing opportunities for recreation. Ecosystem accounting enables the examination of these trade-offs. (SEEA _EEA v1, para 3.3.)

41. To support evaluation of these trade-offs ecosystem services are grouped into different types. In SEEA Experimental Ecosystem Accounting, building on a number of large ecosystem service measurement projects, three broad internationally agreed categories of ecosystem services are used (SEEA _EEA v1, para 3.4):
    - Provisioning services relating to the materials that can be harvested from an ecosystem (such as the harvesting of timber from forests);
    - Regulating services relating to natural processes (such as the benefits from clean air that has been filtered in the environment) 11; and
    - Cultural services arising from human interaction with nature (such as benefits from recreation).

42. Such broad categories are defined in the Common International Classification of Ecosystems Services (CICES)

Spatial location of beneficiaries

43. The generation of ecosystem services is assumed to be able to be attributed to particular ecosystem assets whose spatial area is known. However, it is not necessarily the case that the users of the ecosystem services are located in the same spatial area. This is particularly true of regulating services and cultural services where the beneficiaries may often live in cities and large urban areas while the services are generated in ecosystems away from these areas. (SEEA_EEA v1 para 3.31)

44. Although a simple assumption regarding the location of the beneficiaries cannot be made, it is important in accounting for ecosystem services that attempts are made to understand the location of beneficiaries. This information is needed to ensure that changes in the population of beneficiaries are taken into account in measuring the volume of ecosystem services. They should also be taken into account when developing estimates of ecosystem assets since measures of expected ecosystem service flows will be related to changing populations of individuals and enterprises. (SEEA_EEA v1 para 3.31)

45. Irrespective of that, not all "cultural services" are tourism related, it seems obvious that tourism population associated to a particular ecosystem should be estimated. It should be highlighted that "tourism population" is a tourism statistics concept proposed by INRouTe

for measurement and analytical purposes linked to concentration / diffusion of tourism activity indexes as well as for setting up tourism environmental indicators (see Glossary)

Classification of ecosystem services

46. Not all "Cultural services" are tourism related but tourism is nevertheless associated to them. INRouTe can contribute to a more precise conceptualization of Cultural services as referred in the SEEA Ecosystem Accounting document at different levels:
    - at the proper structure of CICES (at least at the broad level) by clarifying the proper concepts and wording to be used
    - the present text lacks of a precise understanding of present IRTS 2008 when referring to tourism (the terms "tourism destinations", "recreation and tourism", "recreation and tourism industries", "number of tourists who visit certain areas", "increased number of visitors in the tourism industry", etc. should be properly used and defined)

47. Also in relation with Ecosystem Accounting Units (EAU) and tourism contribution for the generation of ecosystem services, INRouTe has already drafted guidelines in order to link at the tourism destination levels visitor (the basic unit in tourism statistics), travel party and household (the proper unit in macroeconomic statistics accounting frameworks).