Integrated Environmental and Economic Accounting in Italy

C. Costantino, F. Falcitelli, A. Femia, A. Tudini

ISTAT, Italy

Introduction

The debate on sustainable development is mainly focused, in Italy, on issues related to the interrelationships between the natural system and the economic system. This occurs both in the sphere of political discussion and in the context of related statistical work.

The interaction between economy and environment is taken into account in different contexts by various disciplines. In some cases ecologically sustainable development is addressed by means of methodologies inspired by some accounting vision of the problem at issue, all of which, in recent years in the Italian debate, have used the label "environmental accounting". In fact, this label indicates a variety of activities, which range from institutional ones to business management, from analytical work to measurement exercises; furthermore, they may be focused on macro as well as micro level and may have a national as well as a local perspective.

The first Italian strategy for sustainable development has been explicitly defined with the "Environmental action strategy for sustainable development in Italy" (EASSDI),[1] issued by the Ministry of the environment and adopted by the Inter-Ministerial Committee for Economic Planning in 2002. It includes environmental accounting in a broad sense among the instruments to be used for environmental action and sustainable development. Environmental accounting in a broad sense is also the subject of a bill on environmental accounting (EAB) currently under discussion in the Italian Parliament; this aims at introducing the adoption by the government of planning documents concerning ecological sustainability which are to be linked to those normally adopted for economic planning.

Within environmental accounting envisaged at the strategic and legislative level by the EASSDI and the EAB respectively, a crucial role is attached to integrated environmental and economic accounting developed by Istat, thus indicating a great attention given by the political world to environmental accounting of official statistics. This highlights growing political awareness about the potential of this discipline as a tool for structuring statistical information on economy and environment in a perspective of ecological sustainability. Especially in the context of the EAB it is believed, also, that not only the production of the relevant statistics but even the use of the same statistics in the political debate on sustainable development can be better structured by making use of environmental accounts.

1. See Ministero dell'Ambiente e della Tutela del Territorio (2002).

The emphasis put by the EASSDI and the EAB on Istat environmental accounting stems from the perceived capability of Istat environmental accounting to deal with these two dimensions of sustainable development – the economic and environmental ones – in an integrated way.

As a matter of fact, environmental accounting in Italy is strictly linked with work at the international level on this subject, which in turn has been focused on sustainability issues since its very beginning. As a consequence, investigating interrelationships between the economic and environmental dimensions of development has been put at the core of the same work. This has led, as described in the SEEA2003, to the definition of frameworks that are of particular interest for the measurement of sustainable development thanks to the links established between the environmental and economic aspects covered.[2] It should be noted, also, that environmental accounting developed at the international level has been conceived according to main national accounting concepts and definitions, and several modules have been defined as satellite accounts to national accounting. Physical and monetary aggregates stemming from environmental accounting can therefore be used in a modeling context, thus helping economic analysis in an ecological sustainability perspective, as well as facilitating the construction of various measures of sustainable development based on an integrated view of the economy and the environment.

In the following paragraphs, the structure of the above mentioned EAB, its main objectives and the role it envisages for environmental accounting frameworks are discussed (par. 2), as well as the approach followed at Istat in identifying accounting frameworks to measure ecologically sustainable development (par. 3). As far as the Istat approach is concerned, a discussion of the complexity of the interaction between economy and environment emphasises the importance of referring to an analytical framework such as the DPSIR model and highlights a number of basic concepts followed at Istat in identifying a framework for developing environmental accounts (par. 3.1). Then the overall accounting framework, looked at as both a structure for the specific environmental accounts implemented (par. 3.2.1) and as a rationale for the definition of systems of indicators (par. 3.2.2), is discussed, the focus being on the accounting framework's capability to ensure integration of environmental and economic aspects. Some concluding remarks are in paragraph 4.

Environmental accounting frameworks in a bill for introducing sustainable development in government planning

The political debate going on in Italy on environmental accounting in a broad sense emphasises, as anticipated in the previous paragraph, a need of environmental accounting frameworks that are suitable for structuring not only the production but also the use of statistical information in decision taking and policy making for sustainable development.

Such an evolution towards user-oriented frameworks is highlighted by environmental accounting concepts/frameworks that are embedded/envisaged in the above mentioned EAB. This is currently under discussion in the Italian Parliament under the title "Central

2. See United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, World Bank (2003).

and Local Government Environmental Accounting".[3] Such bill, which has given impetus to the debate recalled above, is focused on environmental accounting in a broad sense for General Government planning towards an environmentally sustainable development path.

The bill aims at introducing the so called "Documents concerning the ecological sustainability of development" (DESDs from now on) as new planning tools to be approved by Central and Local Government. These documents should include information and targets concerning the environmental dimension of the development in a sustainability perspective; furthermore, they should be approved – by each unit of General Government (*i.e.* State, Regions, Provinces, and Municipalities) – together with the approval of the corresponding financial and economic planning documents.

Besides this *environmental planning tool – i.e.* the DESDs – the bill aims at introducing an *environmental information tool* to be approved on a regular basis for supporting the elaboration of the DESDs: such a tool is a system of "Environmental accounts" (EAs from now on) to be adopted by each unit of General Government.

The regular approval of both tools aims at introducing a twofold parallelism:

3. between economic and environmental planning, in practice between financial and economic planning documents on the one hand and the corresponding DESDs on the other hand;

4. between economic and environmental information, in practice between tools which support economic and environmental planning, i.e. economic accounts on the one side and the EAs on the other side.

The bill does not specify the contents nor the frameworks for the DESDs and the EAs it envisages. Nonetheless, the bill gives a number of general criteria and indications to that end.

As far as the DESDs are concerned, the following criteria are pointed out:

- they should contain a selection of results and information provided by the EAs;
- the selection of results and information from the EAs should vary according to the institutional level of General Government by which the DESDs they support are approved;
- the results and information extracted by the EAs should be organised in a way that would allow a comparison with financial and economic planning documents;

3. In 1998 a first bill, with a similar denomination, was presented in the Senate, followed by four more bills, almost identical to the first one. Following a common examination process, an amended text based on the first bill was passed by the Senate, but not by the Chamber – the other body of the Italian Parliament – within the period of office of the previous legislature. In 2001 the same text previously passed by the Senate has been presented again and is presently under discussion, again at the Senate. Similarly to what had happened before, three more bills have been presented soon after the reiterated presentation of the first bill. Although these three bills are slightly different from the first one, even in this case a common examination process for all the four proposals has been set up by the Parliament.

- the EAs results and information should be included in the DESDs gradually, taking into account the state of the art and soundness of official statistics environmental accounting.

As far as the EAs are concerned the bill gives the following main indications:

- they are to be produced within the National Statistical System;
- they should describe the interactions between economy and environment, with particular reference to environmental "pressures" and "responses" (environmental expenditures),[4]
- the content and framework of the EAs should vary according to the institutional level of General Government by which they are adopted;
- the content and framework of the EAs should be defined and changed taking into account the state of the art of official statistics in this field at the international and national levels.

The bill also calls for operational frameworks, which, are to be defined subsequently, based on the above criteria and indications, by means of laws by decree to be enacted once the bill is passed.

Despite the fact that the bill at issue has not been passed yet, a number of Local Government bodies have launched experimental projects for developing environmental accounting in a broad sense at the local level. At the present stage very few projects have been finalised. The work in progress shows mainly the following:

- these projects are mainly focused on EAs and not on DESDs;
- in order to develop EAs at the local level, their intention is to make reference to environmental accounting approaches and modules developed within the international and national official statistics context (*e.g.* the EPEA5);
- most of these projects are in fact exclusively centred on the calculation of environmental expenditures carried out by the Local Government unit; this in practice implies making a re-classification of the public expenditure concerned, based on the budget analysis method. In order to do that a number of projects make reference to the EPEA and in particular to the CEPA classification;
- some projects – in addition to the calculation of environmental expenditures carried out by the Local Government unit – envisage to develop a system of "pressure" and "state" indicators referred to the territory managed by the Local Government unit; such an approach is a sort of hybrid between a micro and a macro one; as a matter of fact, environmental expenditures carried out by the Local Government unit correspond to a micro perspective, while the environmental pressures born and the state of the environment observed in the whole territory managed by the same unit correspond to a macro perspective;
- there is a great heterogeneity in methods and results, although it is the intention of most projects to make reference to standardised international environmental

4. According to the DPSIR model. See paragraphs 3.1 and 3.2.1 in the present paper.

5. See Eurostat (1994 and 2002a).

accounting approaches. This may produce a certain level of confusion, to the extent that the content of international definitions, classifications and accounting schemes is changed while keeping the original labels.

The bill described above highlights the demand of environmental accounts coming from policy makers, who are interested in having the support of official statistics in decision taking and planning at the different levels of General Government. One crucial point is that there is a twofold need of user-oriented frameworks; these are:

5. an accounting framework for defining and organising the EAs to be adopted by the different levels of General Government;
6. a framework for identifying and organising within the DESDs of the different levels of General Government the information and results to be extracted from the EAs.

This need of frameworks is also emphasised by the experimental projects launched so far by Local Government units, given the heterogeneous and sometimes confused approaches that are being followed in an attempt to implement the bill on a pilot basis at the local level.

As far as the EAs are concerned, the same experimental projects suggest, in particular, that a user-oriented accounting framework for Central and Local Government units can be defined by selecting and organising relevant components from accounting frameworks and modules developed at the international level within official statistics. While it appears that there is no need of completely new frameworks, the experience made so far also suggests, however, that there is a need of guidelines for a proper application of existing standardised approaches.

The Istat approach to frameworks for measuring ecologically sustainable development

The complex interaction between economy and environment

The successful search for an organic and, to the extent possible, complete statistical description of the interrelationships between the economic and environmental dimensions of development is one of the basic features of environmental accounting. A clear vision of these interrelationships has therefore been considered to be essential since the beginning of work developed at Istat in this field. To that end, a map of the relevant relationships in the technosphere/ecosphere dialectic has been identified in the well-known and internationally agreed-upon DPSIR model.

This model provides a very effective representation of the environmental/economic interaction circuit in a sustainability perspective. As it is described in Figure 1, the model leans on the description of a strong connection between the components that form it: man, with all his activities (driving forces), causes stress (pressures) to the natural environment, whose conditions (state) tend to be modified as a consequence of this stress;[6] wherever these modifications of environmental conditions turn out to be undesirable for man (impact), the anthropic system tends, in turn, to react (response) to the environmental change, to eliminate the causes or the consequences; in turn, when

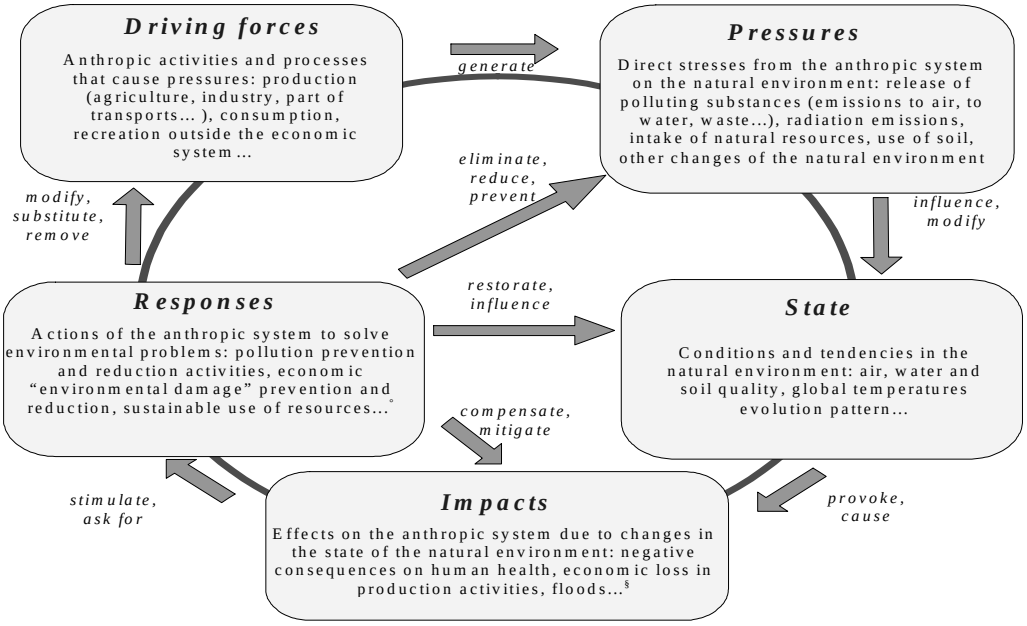
6. The fact that the conditions of the natural environmental are the result of the combined effect of stress produced by the anthropic system and the spontaneous evolution of the natural system is not looked at here.

these responses are intended to eliminate the causes, they retroact more or less effectively on the pressures carried out by man on nature.

Partly due to the heterogeneity of the elements that are included in the DPSIR model (both *between* and *within* the boxes) and partly due to insufficient knowledge of complex interactions, one can not rely on a series of identities that tie all the elements of this environmental/economic interaction circuit in a unique accounting framework. Starting from the DPSIR model, therefore, there is no way to derive from it directly a framework for describing the interrelationships between economy and environment in an accounting fashion.[7]

Nevertheless, the DPSIR analytical framework is seen as an essential reference for developing environmental accounting at Istat in a way that is meaningful in a sustainable development perspective.

Figure 1. **The DPSIR circuit**



Notes:

§ The social system at large, and not just the economy, is affected by changes in the state of the natural environment. This may be an important source of demand for ecological sustainability policy and may retroact on the economy. To the extent that this occurs, impacts on the social system are accounted for in the environmental/economic interaction circuit even though they do not have, *per se*, an economic or an environmental dimension. Their analysis, however, is not a current task of environmental accounting and integrating them in a common "accounting" framework would require, *inter alia*, a substantial enlargement of social accounting schemes.

° There are examples of responses aimed at solving environmental problems which are addressed to the social system, *e.g.* information campaigns directed to changing social behaviour as a response to the need for energy saving. They are accounted for in the environmental/economic interaction circuit insofar as they imply economic costs and/or retroact on economic behaviour.

7. Differently from what can be done, for instance, with the "income circuit" of National Accounting.

The heterogeneity of the different elements included in the DPSIR model stems from the very complexity of the real world. Environmental accounting does not aim at bypassing this complexity by establishing a common unit of measure for all relevant things, *e.g.* by means of monetary values.[8] When the different dimensions of sustainable development are considered, the *reductio ad unum* of the vast variety of phenomena that have to be kept under control for the development to be sustainable may prove hardly satisfactory

Sustainable development is an intrinsically multidimensional concept: to the extent that there is no way to compensate an unsustainable situation in one dimension with a *plus* in another dimension, the requirements to be satisfied for each dimension must be all simultaneously fulfilled. In other words, looking at the overall sustainability of the development, the trade-offs and synergies concerning the choices on mobility and global warming, social security and instruction, income generation and protection of biodiversity cannot be annihilated by weighing and summing up the respective indicators.[9]

Sustainable development and welfare measurement are fields where the complexity of the world irreducibly dominates all reductive approaches. A balance is to be found, therefore, between the need for effective communication and the importance of not hiding important facts. Policy-makers themselves may found advantages from keeping sight on all relevant variables, as opposed to seeing them all reduced at one; in fact, no statistical method can be recommended as a substitute for responsible political choice, for establishing what is better or more necessary.

The recognition that – given the real world complexity – different measurement units need to be simultaneously used in order to have an acceptable description of reality has been one fundamental pillar of the development of Istat environmental accounting since the beginning.[10] Thus, single balance-sheet-like exhaustive accounting schemes deemed capable of measuring at once all crucial aspects of sustainability concerning the technosphere/ecosphere dialectic have not been regarded as the best option.[11] Instead, the primary objective has been to develop, according to an overall accounting framework like that provided by the SEEA2003, a well articulated system of environmental accounts, concerning various aspects and moments of the environmental/economic interaction circuit represented by the DPSIR model and integrated through a common basis of concepts, definitions and classifications.

8. See the arguments raised in the SEEA2003 and Costantino (1996). We also regard as important the issue of the very limited substitutability that may occur in the real world. When absolute impossibility of interchange between certain resources occurs – not just between economic and natural ones, but also between different natural resources – this corresponds, on the measurement ground, to an impossibility of establishing exchange ratios between the different resources themselves, if physical or monetary aggregates that have a clear meaning in a sustainable perspective are to be calculated.

9. The fact that a ratio may be calculated at which one resource can be exchanged for another one on actual or hypothetical markets is also relevant: it means that both produced and natural resources may have an economic value. These values, however, may or may not be related to all the functions that natural resources do have in nature according to an ecological sustainability perspective. As a consequence, an "environmentally adjusted" monetary aggregate based on consideration of actual and hypothetical markets may be questionable in such a perspective.

10. See Costantino (1996) on directions for the developing integrated environmental and economic accounting in Italy, which have been adopted in the recommendations given by a Commission set up in 1991.

11. A *fortiori* this is valid when taking into account also other aspects of sustainability.

In this view each specific accounting scheme is supposed to contribute valuably to the measurement of economic/ecological aspects of sustainable development. In practice, the Istat approach is that of a gradual development of the measurement tools, a concentration of efforts on a limited number of environmental accounting modules – the ones most demanded by policy-makers – and on disseminating knowledge on the chosen modules.

A framework for accounts and a rationale for indicator systems

Environmental accounting modules

Work on environmental accounting has been developed at Istat, since the beginning of the 1990s, in response to the need of providing an integrated view of the economic and environmental dimensions of development. This corresponds to a vision of how to measure sustainable development like the one now embedded in the above mentioned EASSDI and the EAB.[12]

While the overall work is developed at Istat in a way consistent with the framework set out with the SEEA2003, the implementation of the specific accounting schemes is consistent with the main work going on in this field within the European Statistical System and is closely linked to the Eurostat statistical programme (Eurostat, 2002b).

Current projects are focused on a number of environmental accounting modules which have been given high priority in a round table organised by Istat and the Ministry of the environment in 2001. The participants in the round table, among which representatives of the central government, welcomed the achievements of official statistics in the field of environmental accounting and supported Istat's current statistical programme in this field. In particular, the round table recommended continuing efforts on modules which Istat had already given high priority such as the Economy-wide Material Flow Accounts (MFA), the National Accounting Matrix including Environmental Accounts (NAMEA) and the Environmental Protection Expenditure Account (EPEA).[13] Later on all these environmental accounting modules have been included in the recommendations that the Eurostat Task Force "European Strategy for Environmental Accounting" has prepared for the Statistical Programme Committee (Eurostat, 2002c).

Considering the DPSIR circuit has been useful, as explained in previous paragraph 3.1, to better understand the complexity of interactions between economy and environment and thus to define the basic Istat approach to environmental accounting. The same rationale has been enlightening in identifying priorities for developing work in this field having in mind ecological sustainability issues.

In the environmental/economic interaction circuit, moments of *direct* interrelationships between the human and the natural systems – *i.e.* those of immediate physical interaction between parts of the two systems – can be identified in the Pressures box and in the State-Impacts arrow. These direct interrelationships are of two different kinds according to their "direction", *i.e.* to whether it is the economic phenomena that causes a change in the environmental conditions (Pressures) or *vice versa*

12. See paragraphs 1 and 2 in the present paper.

13. It is assumed that the environmental accounting modules mentioned here are well known; no presentation of them is made, therefore, in the present paper. As useful references, see Eurostat (2001 for MFA; 2000 for NAMEA; 1994 and 2002a for EPEA).

(State-to-Impacts arrow). All other boxes and arrows identify elements that are indirectly relevant for the actual interactions.

In the current formulation of environmental policy, both nationally and internationally, important objectives relate to environmental pressures.[14] Pressures are indeed the actual scope – though indirect – of policy action. It is important to point out, however, that the use of environmental pressure indicators as instruments for monitoring the effectiveness of societies' efforts towards sustainability should be accompanied by the use of other planning instruments such as state indicators, which tell how much more efforts are still needed, and driving force indicators, which are subject to the direct influence of policy (Responses). A system of driving force and state indicators should therefore be set-up, parallel and connected to that of pressure indicators, in order to create a coherent and complete reference for action.

Since the physical phenomena are a sustainable development issue before and possibly more than their economic consequences, the measurement of Pressures has been given the highest priority within Istat environmental accounting. Besides Pressures, also Responses have been put at the centre of the accounting framework, the former being the targets and the latter the instruments in the immediate reach of policy. The MFA and NAMEA modules cover the Pressures side; EPEA the Responses side. In the middle/long term, the development of balance sheets covering quantitative and qualitative aspects of selected natural assets will enable, *inter alia*, the formulation of environmental policy also in terms of objectives for the state of the environment.

The DPSIR model can also be looked at as a framework in which the statistical tools developed to measure the ecological sustainability of the development can be contained and organised, thus clarifying the positions and the mutual relationships of the elements of the environmental/economic interaction circuit to which the same statistical tools refer. Figure 2 shows the placement of Istat environmental accounting priority modules in the DPSIR map.

Such an intersection between the environmental accounting framework and the DPSIR analytical framework also helps to understand the meaning of the aggregates provided by the environmental accounts developed, maximising the communicability of their results.

As for the kind of the statistical tools to which priority has been given at Istat within environmental accounting, it is possible to identify two complementary approaches: 1) balance-sheet-like accounts for particular aspects, *i.e.* for families of interrelated phenomena that have a common unit of measure and for which some accounting identity can be defined on the basis of *necessary*[15] mathematical relationships; 2) side-by-side measures of environmental and economic phenomena that constitute different aspects or consequences of the same human activities. Both are defined according to the principles of National Accounting; the economic aspects are measured in monetary terms where appropriate, while environmental variables maintain their own units. Both kinds of accounts are present in Istat work on environmental accounting: MFA and EPEA are of the first type, NAMEA is of the second one.

14. With respect to this, international negotiations on the emissions of air pollutants are a well-known example.

15. *I.e.* their fulfilment does not depend on the actual behaviour of the systems they represent.

Developing systems of indicators: the case of sector environmental pressure indicators

Environmental accounting is a discipline which not only enables the production of a number of accounting modules; it also provides a framework that can be enlightening when developing, in an ecological sustainability perspective, environmental statistics and indicators.

The possibility of a specific contribution from environmental accounting is currently being considered by the European Statistical System Task Force on Methodological Issues for Sustainable Development Indicators (TF SDI),[16] among whose main tasks there is analysing and possibly developing suitable frameworks for statistical work on indicators of sustainable development (Eurostat, 2002d).

Environmental accounting has been found very useful in methodological work on environmental indicators at Istat, where the discipline has been developed building on both national accounting and environmental statistics expertise. One interesting result of this combination has been the establishment of what here is referred to as an environmental accounting rationale. It is in a sense a way of thinking, which leads to the systematic adoption of main national accounting concepts in the statistical description of interrelationships between economy and environment, while taking stock of methodological achievements in environmental statistics.

Such a rationale has been applied in methodological work on sector environmental pressure indicators. This work started in the 1990s with a project for the sector Tourism carried out jointly by Istat and Statistics Sweden within the Eurostat SIPs,[17]., followed by another project carried out by Istat with the aim of harmonising the results obtained for the different sectors covered by the Eurostat SIPs (Costantino, Femia, 2002).[18]

The two studies, centred on target sectors identified at the political level,[19] refer to human action at large, with no limitation, in principle, to activities covered as such by national accounting statistics; the target sectors overlap among each other to a certain extent. In such context, two contributions stemming from the environmental accounting rationale seem to be of particular interest. One has to do with the need of clearly establishing the boundary between the natural sphere and the sphere of human action; the other one deals with a systematic approach to the consideration of the different human activities generating environmental pressures, investigated by target sector.[20]

16. See Steurer (2003).

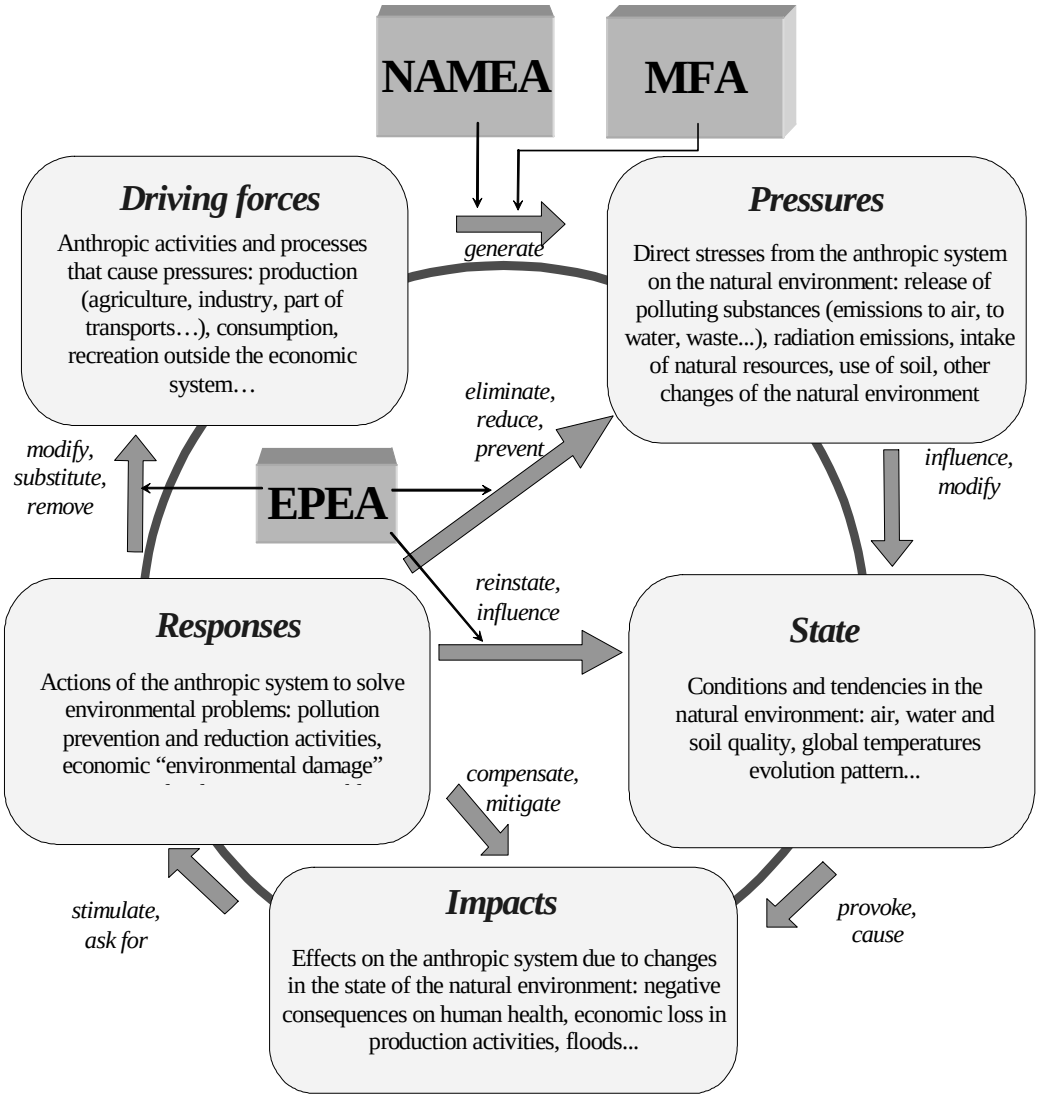
17. See Cammarrota, Costantino, Fängström (1999).

18. Both projects obtained financial contribution from the European Commission. The SIPs – Sectoral Infrastructure Projects – were launched by Eurostat in the framework of the European ESEPI action – European System of Environmental Pressure Indices (Commission of the European Communities, 1994).

19. The different SIPs cover the five target sectors identified as areas of special attention in the 5th Environmental Action Programme for the European Communities – *i.e.* Agriculture, Energy, Industry, Tourism, Transport – plus Waste management.

20. See Costantino, Femia (2002).

Figure 2. **Placement of Istat environmental accounting priority modules in the DPSIR map**



The first point concerns a preliminary step which is to be taken prior to identifying the relevant environmental pressures. The latter are defined in terms of the material/energy flows between the natural system and the anthropic system due to human action, and one should keep in mind, in particular, that wherever a flow is considered as a pressure exerted by the economic system on nature, at the same time there is a boundary line to be considered as crossed by the flow at issue, which is exactly the one between economy and environment. With respect to this, making reference to the SNA[21] concept of production boundary may even help to arrive at a clearer definition of the boundary between the natural sphere and the sphere of human action at large. This boundary should be kept univocal in developing a system of environmental pressure indicators by target

21. Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank (1993).

sector, and consistent among the various sectors under examination that compose the anthropic system. Once the boundary between the natural system and the anthropic system is clearly identified, when reference is made to the environmental pressures of a given group of activity, unless expressly indicated otherwise, these are intended as the flows crossing the boundary that are directly generated by the activities belonging to that group; environmental pressures indirectly generated via other activities that are either "up-stream" or "down-stream" the activities at issue – in an organisational or technical sense – are excluded. Such a scheme is similar to national accounting schemes, where there is just one production boundary in coherence to which individual economic activities are defined and where, for example, the value added or the employment of a given group of activity are those directly generated by it.

As for value added and employment, the environmental pressures that are indirectly due to a given number of activities are important, nevertheless, from an analytical and normative point of view; they can be calculated starting from direct environmental pressures, provided that these are known for all the relevant intermediate steps.[22]

More generally, an environmental accounting rationale may help to define a set of indicators that, while concerning different environmental issues, are brought together to form an organic framework. This can be done, in particular, thanks to a definition of the relevant activities that is univocal for all the measurements and estimations made in relation to the various environmental issues covered. The identification of a list of activities as a tool for clearly delimitating the different target sectors at issue is crucial in order to avoid the risk that the indicators, calculated with reference to badly delimitated sectors, supply distorted signals when considered for policy making. A second important contribution given by environmental accounting seen as a rationale relates, then, to the need of defining and delimitating the target sectors at issue in terms of activities causing environmental pressures.[23]

A delimitation of sectors on the basis of lists of activities has been developed at Istat according to criteria consistent with a national accounting perspective.[24] For each target sector, in the systematic analysis of all the human activities that generate environmental pressures a first important distinction has been that between activities recorded as such in the national accounting system, or reflected there in some way, and the other human activities to be taken into consideration. This distinction is basically tantamount to identifying, in addition to the production activities recorded in the national accounts, other possible activities that may or may not have a counterpart in transactions recorded in this system, but which create environmental pressures to be considered in addition to those already associated to production activities. The practical implication of the

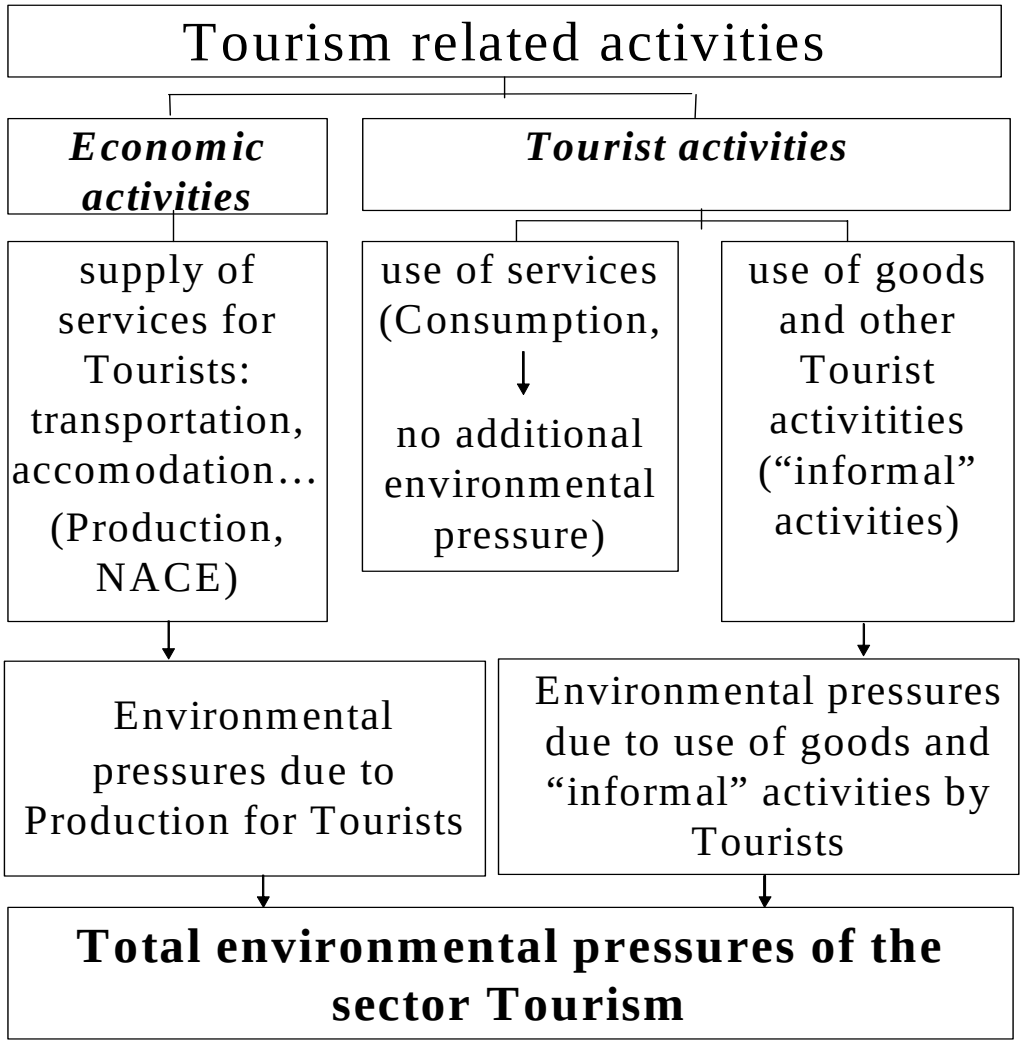
22. E.g. this can be done via the vertical integration of sectors with the Input-Output technique, at the branch-of-activity level, and with the analysis of the life cycle at the product level.

23. It should be noted that the sectors at issue are to be considered separately but not necessarily unlinked, given possible overlapping such as that between e.g. the Transport and the Energy sectors.

24. The fact that not all dimensions of the definition of a sector can be reduced to the allocation of activities, when speaking of environmental pressures, has not been neglected. Besides the physical flows in which the current functioning of the economic system is substantiated, indeed, there are in each sector accumulated stocks. In general terms, the following criterion has been followed: when it is the existence of stocks that is a cause of environmental pressures, these should be associated only to the sectors using the same stocks (one such case could be that of roads); when it is their construction or dismantling that is a cause of environmental pressures, these should be associated to both the user and the producer (of the construction or dismantlement service) sector.

distinction shown here relates to the fact that the identification of those activities that are not recorded in the national accounts may not be immediate and may require "ad hoc" investigations (no standard classification – such as the NACE for production activities – is available).

Figure 3**. Delimitation and schematic representation of the environmental pressures due to the sector Tourism**



This approach has been introduced by Istat when dealing with the sector Tourism, which is a particularly interesting example to consider.[25] As can be seen from the basic scheme reported in Figure 3, different sets of activities which form the sector Tourism are

25. Tourism economic satellite accounting is dealt with in Commission of the European Communities - Eurostat, Organisation for Economic Co-operation and Development, World Tourism Organization, United Nations Statistics Division (2001).

distinguished.[26] First of all, production activities at the service of tourists, on one side, and tourists' activities, on the other side, are separately identified. Within the latter, furthermore, the use of services supplied to tourists is distinguished from the use of goods and other tourist activities, which form a distinct set of activities with respect to those which immediately involve economic transactions and whose environmental pressures remain attributed to the production sphere.[27] It should be noted that there is concomitance between the purchase and the use by tourists of the services supplied to them by economic activities; as a consequence, the consumption of services provided by the activities included in the NACE Rev.1 does not create separate environmental pressures.[28] The use of services by tourists is not to be taken into account for the delimitation of the sectors, therefore, in addition to the supply of the same services. On the other hand, the use of material goods bought as such – differed in time with respect to the act of purchasing them – may cause, instead, separate environmental pressures, and the same applies to other tourists' activities whose relevance under the environmental profile does not depend on the use of any particular product, such as for instance the lighting of fires in forests; all these activities, therefore, are also to be accounted for in the delimitation of the sectors.

Activities carried out "in the economic system" and "informal activities" exhaust, then, the set of human activities and the union of their respective environmental pressures gives the set of all (anthropogenic) environmental pressures. The distinctions described above have been adopted systematically and applied, as appropriate, to all the target sectors at issue, for the examination of anthropic activities in order to identify environmental pressures caused by them.

Further distinctions have also been made within production activities, by identifying separately principal, secondary and ancillary ones have been distinguished. To that end, the individual items of the European classification of economic activities (NACE Rev.1) have been considered. For each sector, first the activities that provide the principal output have been identified, then the secondary activities that are homogeneous to the principal ones have been added – regardless of the sectors in which they are actually carried out – thus leading to a delimitation of the six sectors which generates ideal groups of homogeneous activities.[29] Finally, some production activities that belong to one of the six sectors – when carried out as principal or secondary activities – can also appear as ancillary activities in other sectors; in such cases they have been identified as well, in order to be properly accounted for.[30]

---

26. The figure is elaborated starting from a similar figure in the SIP report on the sector Tourism (see Cammarrota, Costantino, Fängström, 1999, mentioned before).

27. In this sense they are labelled here as "informal activities".

28. As a matter of fact, the environmental pressures generated at the time of use of a service (for example, a trip in a taxi) coincide with the ones due to its production, already accounted for among those considered in the relevant sector.

29. The approach followed is the same applied, for example, for the construction of Input-Output tables for homogeneous branches of economic activity.

30. As an example of the importance of doing so, one may consider the case of waste transport, an activity that is explicitly included in division 90 of the NACE Rev.1, "Disposal of solid waste, wastewater and similar": it is advisable to include this activity both in the Transport and in the Waste Management sectors. Whatever the role (principal, secondary or ancillary) of this transport activity in the economic units in which it is carried out, it is under the direct and determining influence of transport policy; environmental pressures coming from

As it is already clear from consideration of the Tourism example, in order to complete the delimitation of the sectors, in addition to identifying the production activities, in some cases the analysis has explicitly taken into account some activities carried out by households, which come under the realm of target sector policies, without being economic activities. Such activities generate environmental pressures that are additional to those put down to the production activities recorded in national accounts. As a matter of fact, these additional environmental pressures are generated either during a consumption phase which is separate from the production of the goods being consumed, or in activities that, as such, do not have any counterpart in terms of production, although their execution contributes – as for example in the case of many recreational activities – to satisfying households' needs.

Concluding remarks

The current debate on ecologically sustainable development in Italy, while focusing on a broad concept of environmental accounting, emphasises how an environmental accounting framework can help to structure even the use of statistical information for decision taking and policy making in a sustainable development perspective.

Such evolution is highlighted in particular by the fact that the bill currently under discussion in the Italian Parliament[31] calls for laws by decree which are supposed to identify accounting frameworks for developing environmental information tools and environmental planning tools as well. Since the former are to be found within environmental accounting of official statistics – supposed to provide the figures for the latter – a crucial step is the use of specific environmental accounting schemes of official statistics, in particular the Istat ones.

As a matter of fact, the main focus of the experimental projects carried out so far in an attempt to implement the bill on a pilot basis at the local level has been on the environmental information tools envisaged in the same bill, *i.e.* the EAs. For these, it appears that there is no need for completely new frameworks, though there is a need of guidelines for a proper application of existing standardised approaches.

In order to identify a suitable overall accounting framework, it has been useful to consider the complex interaction between economy and environment in the light of the environmental/economic interaction circuit. This has been done on the basis of the DPSIR model, which, while not allowing to set a series of identities as *e.g.* in the case of the "income circuit" underlying the system of economic national accounts, nevertheless provides a basic rationale for analysing statistical information on the interaction between the natural and the anthropic systems. Given the complexity of the real world – as well as the concept of sustainable development itself – it has been considered, then, as an acceptable statistical description of the interrelationships between the economic and environmental dimensions of development, one that is obtained by simultaneously using different units of measure, the necessity of which is not necessarily to be by-passed. What is needed is a well articulated system of integrated environmental and economic accounts,

this activity should therefore be accounted for (also) in the Transport sector. It is also worthwhile to mention that transport of waste is considered in the chapter "Transport" in the 5EAP.

31. See paragraph 2 in the present paper. As explained there, the bill aims at the regular and simultaneous approval of targets concerning the environmental dimension of the development together with the economic policy targets.

focused on various aspects and moments of the environmental/economic interaction circuit.

The overall framework for environmental accounting has been found, therefore, in the SEEA2003. At present, the major focus is on environmental pressures and responses of society, given the importance attached to these aspects in the formulation of environmental policy; in particular, the MFA and NAMEA modules correspond to the targets and EPEA to the instruments that are in the immediate reach of policy. In the middle/long term, the development of balance sheets covering quantitative and qualitative aspects of selected natural assets will enable, *inter alia*, the formulation of environmental policy also in terms of objectives determined for the state of the environment. An accounting framework tailored in this way is supposed to help users in evaluating trade-offs between alternative policies, by providing them with sets of indicators that are integrated to the maximum extent possible through a common basis of concepts, definitions and classifications.

The environmental accounting approach – in a sense a rationale based both on national accounting and environmental statistics expertise – has been found very useful also in methodological work on environmental pressure indicators related to target sectors identified at the political level.[32] In particular, a substantial contribution has been given, within projects funded in the framework of the European ESEPI action, for a systematic definition of the boundary between the natural sphere and the sphere of human action starting from the national accounting concept of production boundary; furthermore, a systematic approach has been provided for looking at the different human activities that cause environmental pressures to be considered by target sector, based on the distinction between principal, secondary and ancillary activities as well as household activities, and having the environmental pressures directly generated by these activities as the variables to be quantified.

That was an example of how an environmental accounting framework, in addition to being essential for the production of a number of accounting modules, can also be enlightening for developing environmental indicators in a sustainable development perspective. Such an approach may also be considered *e.g.* for the work going on within the European Statistical System Task Force on Methodological Issues for Sustainable Development Indicators.

References

Cammarrota M., Costantino C, Fängström I. (1999) *Joint final report of the sectoral infrastructure project – Tourism*, in Eurostat: "Towards environmental pressure indicators for the EU: an examination of the sectors", Luxembourg.

Commission of the European Communities (1994) Communication from the Commission to the Council and the European Parliament on Directions for the EU on Environmental Indicators and Green National Accounting (COM (94) 670 final), Bruxelles.

Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank

32. See paragraph 3.2.2 in the present paper.

(1993) *System of National Accounts 199,* Brussels/Luxembourg,New York, Paris, Washington, D.C.

Commission of the European Communities – Eurostat, Organisation for Economic Co-operation and Development, World Tourism Organization, United Nations Statistics Division (2001) *Tourism Satellite Account: Recommended Methodological Framework*, Luxembourg, Madrid, New York, Paris.

Costantino C. (1996) *First report of the Commission Istat-Fondazione Eni Enrico Mattei for the study of a system of environmental accounting*, in Musu I. – Siniscalco D. (editors): "National accounts and the Environment", Kluwer Academic Publishers, Dordrecht, The Netherlands.

Costantino, Femia, (2002) Environmental Pressure Indicators – Sectoral Indicators Project: Harmonisation of the SIP results, Eurostat, Luxembourg.

Eurostat (1994), *SERIEE – 1994 Version*, Luxembourg.

Eurostat (2000) NAMEA 2000 for air emissions – Manual, Luxembourg.

Eurostat (2001) Economy-wide material flow accounts and derived indicators, a methodological guide, Luxembourg.

Eurostat (2002a), SERIEE Environmental Protection Expenditure Accounts – Compilation Guide, Luxembourg.

Eurostat (2002b) Environmental Accounts 2002 – Present state and future developments, Eurostat Doc. ACCT/02/01, Luxembourg.

Eurostat (2002c) The European Strategy for Environmental Accounting – Report to the Statistical Programme Commettee, Luxembourg.

Eurostat (2002d) *The Task Force Mandate*, Doc. SDI/TF/002/02(2002), Luxembourg.

Ministero dell'Ambiente e della Tutela del Territorio (2002) *Strategia d'azione ambientale per lo sviluppo sostenibile in Italia*, Roma.

Steurer A. (2003) *The use of National Accounts in developing SD Indicators*, Eurostat Doc. SDI/TF/018/04.1(2003), Luxembourg.

United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, World Bank (2003) *Integrated Environmental and Economic Accounting 2003*, on the web.

References

Feeney, Patricia (2001),
"The Trust Business," OECD O*bserver*, No. 225, March 2001.

Oldenziel, Joris (2000),
"The 2000 Review of the OECD Guidelines for Multinational Enterprises: A New Code of Conduct?", SOMO, Amsterdam.

Organisation for Economic Co-operation and Development (2001a),
"The OECD Guidelines for Multinational Enterprises and Global Instruments for Corporate Responsibility", Background and Issues Paper, May 16, 2001, Paris.

Organisation for Economic Co-operation and Development (2001b),
"OECD Roundtable on Global Instruments for Corporate Responsibility", Summary Report of the Roundtable Discussion, June 19, 2001, Paris.

Organisation for Economic Co-operation and Development (2001c),
"The OECD Guidelines for Multinational Enterprises – First Annual Meeting of the National Contact Points", Summary Report of the Chair, September 21, 2001, Paris.

Sabel, Charles, Dara O'Rourke and Archon Fung (2000),
"Ratcheting Labour Standards: Regulation for Continuous Improvement in the Global Workplace", Washington, DC: The World Bank, Social Protection Discussion Paper No. 0011.

Trade Union Advisory Committee (2001a),
"TUAC Survey of the Functioning of National Contact Points", Paris.

Trade Union Advisory Committee (2001b),
"The OECD Guidelines on Multinational Enterprises: A User's Guide", Paris.

Table of Contents