

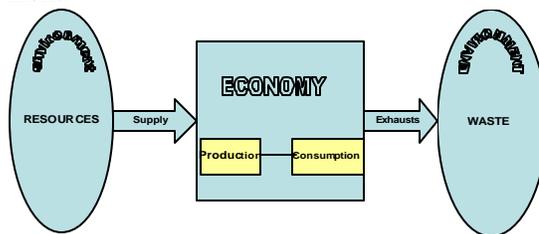
## The Emergence of Macroeconomic Indicators Adjusted with the Environment

Assistant, Ph.D. Giani GRADINARU  
Statistics and Economic Forecast Department

*Achieving sustainable development objectives on a large scale assumes that economic policies are designed according to environment appreciation and economical functions of natural resource. For this reason, the political power needs more info on economic activity and environment condition expressed in natural and currency measurement. This information must be built in a manner that allows the emphasis on the main problem of sustainable development and equity between generations, keeping the health of environment for future generations.*

**Keywords:** *sustainable development, statistics indicators, macroeconomic indicators adjusted with the environment.*

The conditioning economy-environment is so obvious that any attempt to back it up is useless. The environment gives the resources that represent the nucleus of economic provisioning activity. The supply activity is made with two main purposes: goods and services production and consumption. Production and consumption both generate offal's which are released in the environment.



**Fig. 1.** Economy-environment conditioning

The concept of sustainable development leaves no place for separate environment economy treatment. The Rio Conference, Agenda 21, the Johannesburg Summit, scientists' workshops have already put up the conceptual basis for making an economy-environment integrated information system. No country can be left out because you cannot set national borders on environment. Making up an information system regarding sustainable development can be started by identifying many information categories relevant for fundament decisions, even before theoretical and methodological development are established. Therefore, there are

five data categories that can be considered as determinative:

- ✓ Making evident the condition of the environment by factors (water, air, soil, biodiversity);
- ✓ Making evident the pressure on environment through the sectors considered pressure sources;
- ✓ Expenses estimates to avoid urges;
- ✓ Medium cost evaluation according to environment pressure;
- ✓ Making evident the standards that can settle environment pressure;

The first four data categories are not that strongly connected assessment problems, the only problems that may occur are linked to data gathering and gathering and processing efforts methods. Regarding standards value, there are deals linked more or less to scientific opinions, which require a high quality level of information generated by the fact that these are decisions elements in solving environmental problems. Incomplete and insecure information may influence the consequences of economic activity as well as future development.

The efficiency of economic reform policies can be assessed by comparing traditional synthetic indicators with the outcome of environmental data integration. A simple comparison of these indicators cannot give an adequate understanding of the introduction of environment parameters in an economic system. That's why the use of economic-

mathematics modeling is necessary, such as input-output analysis, which has the advantage of predictive and alternative presentation of political, scenarios, in a transparent and analytical manner.

Because economy policies must be designed in a way that concerns their impact on environment, environment policies must consider the political implications. This integration has become a problem today in the conception of environmental politics, for which economy-environment indicators may ease a coherent solution.

The environment statistic-economic analysis can be applied in different stages of the environment decision-making process such as: identifying environmental priorities, identifying the pressure points, designing environment politics, evaluating the effect of the policies. Data can be used to monitor the environment policy effects in terms of public and private commercial activities, as well as positive or negative sector effects induced by industry.

The standard economy indicators, which describe mainly the cash flow in an economy, supply incomplete information regarding the implications of economic activities on the environment. Economic instruments have different possibilities of comparing their results in time and space, but those kinds of methods are not developed for the environment field. The environment information instruments are usually based on physical parameters, while economic information instruments are use physical data as well as values. Thus, there are meaningful deficiencies at indicators quality level which must explain the interdependence economy-environment, a fact that imposes the development of integrated indicators to express a direct connection between economic activity and environment, in the sense of sustainable development. In this direction there can be defined the following priorities:

✓ The need for vertical connection development between economic instruments for macro and microeconomic level, respectively between individual environmental indicators

(microeconomic level) and synthetic indicators (macroeconomic level);

✓ The need for horizontal connection development between economic and environment instruments for regional and sector levels, respectively including environment indicators in a decision making process;

✓ The need to represent environment indicators in time, and building chronological series for most of the indicators that express economic and environment performances.

The National Accounts System (NAS) contains a coherent and integrated set of macroeconomic accounts and balances based on international agreement rules. The system is projected on one side, to facilitate detailed economic analysis policy development and making decisions, and on the other side, to supply key aggregated indicators that can inform the public. These indicators refer to the economic activity (Gross Domestic Product or GDP, NET INCOME, consumption) and have economic content (financial and non-financial resources available for sector and national economy level). The total available resources at a certain moment of time are found, in net value, in National Accounts Balance.

The macroeconomic theory is a wording extension in terms of macroeconomic key aggregates. Usually, national accounts supply data to verify the macroeconomic theory. In the same time, national accounts are applied for parameter sizing in the so-called 'general equilibrium model. In this process, the model's validity is improved by the use of representative historic data.

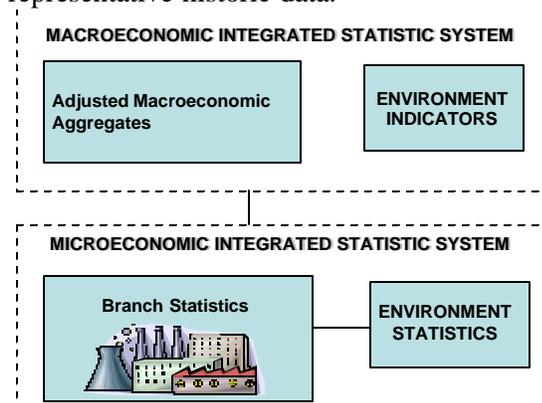


Fig.2. Economy-environment integration for information level

Generally speaking, the goods and services value in the NAS has at its basis demand and supply on the market. NAS and key macroeconomic aggregates are not relevant for all aspects of welfare. For example, in the NAS the cost of production is restricted to the sum of work factors and capital, leaving out nature, for which there are no actual payments. In the same way, work in household and leisure time doesn't have any expression in currency in NAS. The NAS must be regarded beyond economic goods and transaction price of goods and services. It must take into account environment goods and economy-environment flow and highlight economic activities that affect the quality and quantity of environment goods that cause a deterioration of present and future welfare.

The term 'green national accounts' refers to an extension of NAS by including information about the environment (environmental accounts) and the economy – environment interaction (interface accounts). They must contain stock and flow indicators, expressed in physical and value units.

In specialized literature, pretty poor in this subject, two ways of adjustment are discussed, which are rather complementary than different. The "green national book-keeping" development is based, especially, on national economy system, in which statistic reports referring to GDP, import, exportation, final consumption are standard. According to this, the two main concepts emerge in the definition of macroeconomic indicators "adjusted with the environment".

The first type of adjustment, in accordance with the national standard book-keeping conventions, is based on a modification of system boundaries, an extension of national book-keeping purpose by including environment goods related categories. The second is macroeconomic self adjustment which is actually based on the adjustment of economic activities with the new characteristics of the production process, the levels of production and consumption activities, technologies etc in the conditions complied environment standards.

The emergence of the two types of adjustments leads to an identification of four different situations.

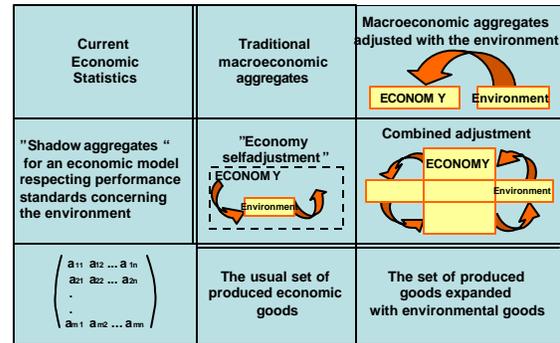


Fig. 3. The matrix of economy adjusted with environment

The upper left cell refers to macroeconomic standard indicators based on national standard book-keeping that estimates GDP and NDP. The upper right cell refers to NDP adjusted with the environment for the existing economic system (NDP adjusted with the environment or green NDP for an economy that was not adjusted). The lower left cell refers to the fact that it hasn't been tried a macroeconomic aggregate adjustment, but adjusting economic activity with the environment. In this case, a hypothetical economic structure is obtained by using correct statistic analysis techniques which gives answer to the following demands:

- ✓ how can we estimate economic performances;
- ✓ how can we modify the present day system by introducing performance standards referring to environment at microeconomic level.

This case can be analyzed by using compared statistic analysis in static and dynamic models, and microeconomic aggregates might be called the green economy GDP, green economy NDP. In the lower right cell, the case combines both types of adjustment. The combination implies changes in economy's structures in the same time with enlarging the boundaries of national book-keeping.

**"Green" macroeconomic aggregates for an unadjusted economy**

The efforts of the World Bank are noticeable in creating a set of indicators that highlight

the structure changes by including environment resources. The efforts are made to modify the net value of goods, by including the environment goods value (primary resources, minerals, oil, gas, forests) estimated, as much as possible to prices on the market. The indicators, built like this are called "real economic indicators" (authentic).

During the discussions over a likely correction of macroeconomic indicators, by taking into consideration environment related aspects, there are several aspects mentioned:

- ✓ The necessity to add to existing costs covered by GDP an evaluation of natural environment deterioration ;

- ✓ The opportunity to give national book-keeping an environment preserving orientation;

During the last 30 years, at international institutions level or statistic offices level there have been made many propositions to modify the national accounts system, in order to take into account the environmental factors. The propositions persuaded an adjustment of operations, flows and stocks in the NAS by including environment elements. The most significant example of these preoccupations is represented by the SEEA-System of Integrated Environmental and Economic Accounting developed by United Nations Organization Statistic Bureau. The SEEA information is the result of national accounts expansion in a manner that allows a separate identification for environment protection expenditure to the accounts level that highlights resources and their use by:

- ✓ Making evident separately the flows and stocks connected to the environment , in conventional accounts;

- ✓ Expending "the economic goods" accounts by including "environmental goods";

- ✓ Introducing the impact of natural goods, caused by economic activities production and population and public administration consumption , as a medium cost effectuated through these activities;

The development of national accounts according to what we said above leads to the following results:

- ✓ Environment cost evaluation generated , on one side , by the use of natural resources ,and on the other by the impact of on environment quality;

- ✓ "Not produced " natural capital book-keeping;

- ✓ Projection and calculation of some macroeconomic indicators adjusted with environmental elements.

### ***Macroeconomic aggregates for a "green" economy***

The concept of adjustment aims the introduction of environment performances in the cost-benefit analysis. Regarded from this point of view, the environmental key functions (natural resources, waste absorption, life support, life diversity, air, soil, water quality) must be associated with a currency. The satellite accounts can be used to organize information.

When we take into account an economic development which considers environmental problems, we must define environment protection expenditure, which includes expenses generated by environment quality deterioration due to economic development and expenses that concern a more rational use of natural resources. This way we might create a new category of expenses that contain: environment financial administration and protection expenses made to avoid repercussions of an environmental damage and expenses that compensate repercussions caused by environment damage. It's true that some of these expenses are already included in the national book-keeping indicators, but they are found in some catalogues that don't allow such a good definition as the one presented. From the point of view of national book-keeping, these expenses are part of the intermediate consumption, some other part in the final consumption (private or public) and finally some part in capital formation, without knowing how much is attributed to environment remaking and degrading prevention.

The expenses made to prevent the incidence of economic activities on the environment must be associated with the season they take place in, or some of it can affect expense's reference period (current period), and some

other part to the period before the book-keeping record (and, as a consequence it affects the past economic development drafts), and a part the future period (like the formation of gross capital).

So, there must be created a book-keeping system specific for environment protection expenses, which takes into account the existing relation between expenses and the components of economic activity (production, consumption) whose real or potential incidence on the environment generate a demand for goods and services corresponding to the expenses. The objectives of this specific statistic and book-keeping system:

- ✓ The evaluation of net cost for environment protection measures which the producers sponsor;
- ✓ Making evident the activities which result into environment protection services;
- ✓ Making evident the use and efficiency of environment protection measures;
- ✓ Making connections between expenses and physical data regarding administration and environment protection.

## References

1. Bateman I. J., Brainard J.S., Lovett A. A., „*Modeling woodland recreation demand using geographical information systems: a benefit transfer study. CSERGE*”, Working Paper GEC 95-06, Centre for Social and Economic Research on the Global Environment, University College London and University of East Anglia, Norwich, UK, 1995.
2. Bran F., „*Componenta ecologica a deciziilor de dezvoltare economica*”, Ed. ASE, Bucuresti, 2002.
3. Capanu I., Wagner P., Mitrut C., „*Sistemul conturilor nationale si agregate macroeconomice*”, Editura All, Bucuresti, 1994.
4. Gradinaru G., „*Economia si mediul, o abordare emergenta*”, în *Revista de Informatica Economica*, nr. 2(22)/2002, Editura Infocrec, Bucuresti.
5. Gradinaru G., „*Economia verde, o noua provocare pentru statisticieni*”, în *Revista de Informatica Economica*, nr. 1(21)/2002, Editura Infocrec, Bucuresti.