

FORE • SCENE



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FORESCENE

Development of a Forecasting Framework and Scenarios to Support the EU Sustainable Development Strategy

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RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	



Determination of cross-cutting driving forces for the environmental topics "water and water use", "landscape, biodiversity and soils", and "resource use and waste"

Introductory Paper

1st Integration Workshop, Brussels (6 September 2006)

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FORESCENE is a specific targeted research project for the “Development of a Forecasting Framework and Scenarios to Support the EU Sustainable Development Strategy” under the Sixth Framework Programme. The challenge addressed by this project is to develop a framework for creating sustainability scenarios, which integrate different environmental topics such as water, soil, resource use etc.

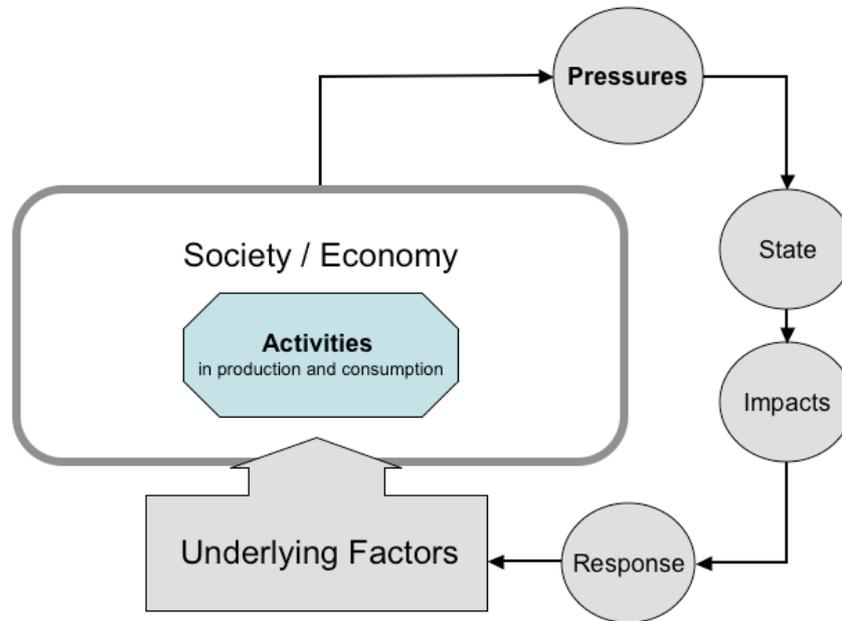
In the general context of the EU Sustainable Development Strategy and to comply with the specific needs of Impact Assessments the European Commission and DG Environment in particular need a robust and scientifically sound forecasting framework to develop harmonised middle and long-term (2015-2030) baseline and alternative policy scenarios. There is also a need to have access to scenarios that can be used for strategic policy preparation to better specify and disentangle the mutual relationships between environmental, economic and social trends, in the context of the Sustainable Development Strategy. By its very nature, sustainable development means that trends in single variables (e.g. economic growth) cannot be studied without considering their impact on others (e.g. resource use), which themselves may have a negative impact on one of the dimensions of Sustainable Development (e.g. additional costs due to increased waste generation or pollution abatement). It is therefore necessary to create a multidimensional analytical framework based on relationships and interactions.

To be effective policy development and appraisal need to understand the key driving forces and their cross-cutting linkages, which lead to, increased pressure on different aspects of the environment. *Cross-cutting driving forces* which are relevant for various environmental and sustainability related problems have not yet been analyzed in a systematic policy oriented manner. Measures, which are designed to solve single problems, are at risk to become symptoms oriented and they may be ineffective due to the complex interaction of environmental effects. If one also regards limited public budgets, this approach is not sufficient to sustain the ecological and physical basis of our economy and society. Developing effective and efficient measures needs to focus on cross-cutting measures, which tend to mitigate several problems at the same time. So far, this has often been not the case, also due to lacking cross-sectoral analysis and scenario building. Moreover, existing environmental policies at the EU level are rather diverse, at different stages of development, and often lacking quantitative targets. Headline indicators, which also represent major, driving forces, are still under development.

The theme of the first FORESCENE workshop is the "Determination of cross-cutting driving forces for environmental topics such as water, biodiversity, resource use and waste". Against the background of main environmental problems, economic and social implications and related policy objectives as described in the background papers, it is the aim of the workshop to address the key drivers of problems, and to determine those cross-cutting drivers, which are important for each of those problems.

A variety of general frameworks make use of the term "driving force", without, however, describing it in great detail. One example includes the *Driving Pressure State Impact Response (DPSIR) framework* used by the European Environment Agency. According to this framework the driving forces result in environmental pressures, which then change the state of the environment. The changed state of the environment leads then to an impact, e.g. loss of biodiversity. Policy makers and institutions respond to the impact by regulations and laws, addressing the stages of the DPSIR framework. Yet the DPSIR framework is a relative linear approach that does not reflect sufficiently the interrelation between different driving factors nor

the multiscale nature of decisionmaking. For a systematic approach that goes beyond the analysis of causal chains, the DPSIR-Framework has to be extended to include influencing factors.



Extended DPSIR-Framework

For example, construction activities for buildings or transport infrastructure may be shortly considered. These activities require excavation and translocation of soil, input of building materials, minerals and fuels, leading to a stock addition and emissions to air, water and soil. The environmental pressures are among others a loss of natural habitats or disintegration effects, possibly leading to a reduction of biodiversity; global warming potential due to the emission of greenhouse gases (for construction and during use phase). The driving forces influencing the performance of the construction activities may be economic, because a certain amount of peoples' income (GDP) is invested in buildings and infrastructures (depending on development status of a country); the environmental pressures will be determined by the resource intensity of the buildings and infrastructure; in countries with lower population density higher resource requirements per capita will result; trends in consumption pattern (e.g. increasing living space per person) may influence resource requirements of private buildings; climate conditions may determine the energy demand (e.g. for heating or cooling) and also the construction design.

In the case of water, construction activities may be of less relevance than for instance agriculture. The same applies to biodiversity and landscape changes. For resource use and the generation of waste construction activities constitute an important activity (amongst others). An analysis of the driving forces will lead to a broad range of influencing factors that directly or indirectly impact the environment.

To operationalise the term “driver” for the project, we propose to distinguish between *direct drivers* (= *activities*) and *indirect drivers* (= *underlying factors*). In the DPSIR framework “activities” are addressed as proximate cause for environmental pressures. By contrast, the indirect driver exerts influence more diffusely, nevertheless determining the environmental performance of activities. These underlying factors can influence one or more activities and, at the same time, being interrelated amongst each other. The environmental impact of driving forces will probably not be grasped by looking at singular causal chains but rather by understanding whether they have a relevant effect on the level and performance of the activities.

On the background of the environmental problem analysis the workshop aims to filter out two core questions for each of the topic fields of water, biodiversity and landscape change, resource use and waste:

1. Activities (direct drivers):

With regard to the environmental impacts to the topic fields, certain economic sectors will have a significant influence, while others will be of low relevance. In a first approach we have set up a sample of economic activities (for the production of certain products) along the NACE-Code which can be expected to be of high relevance at least for one of the topic fields.

- Agricultural and forestry products
- Basic metals
- Chemicals and chemical products
- Construction sector
- Energy and Water
- Food products and beverages
- Machinery equipment
- Motor vehicles
- Transport

The question at the workshop will be, which of these activities are especially relevant for the related topic field and whether there are further relevant activities

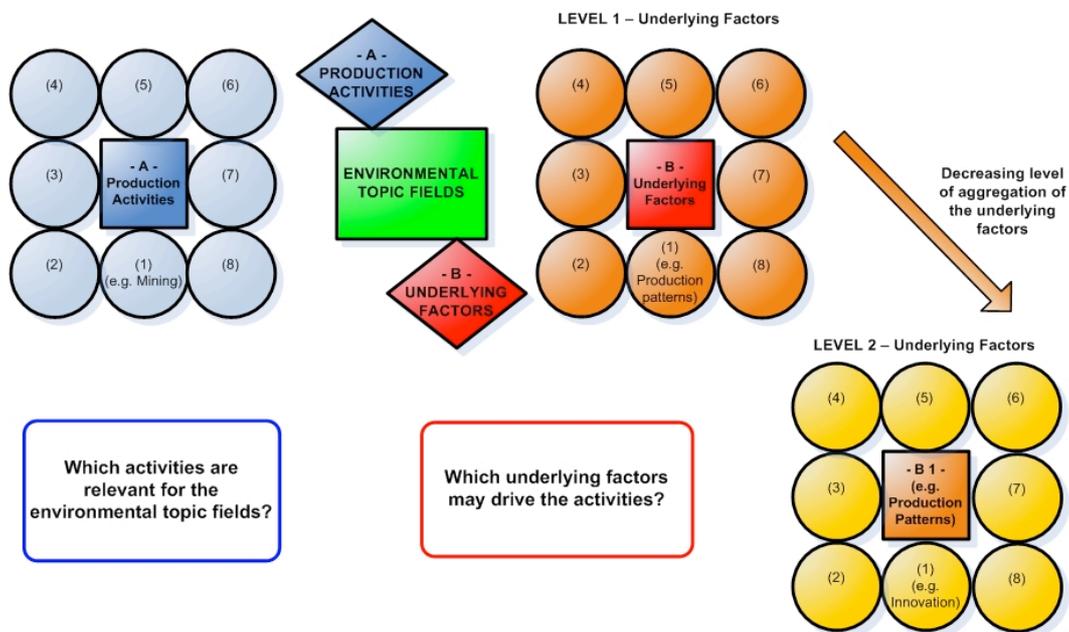
2. Underlying factors (indirect drivers):

For a systematic approach the underlying factors are structured according to different level of specification.

Level 1 (given structure)	Level 2 (possible examples)
<ul style="list-style-type: none"> • Economic development 	<ul style="list-style-type: none"> • Economic growth • Global trade • Investment patterns
<ul style="list-style-type: none"> • Production patterns 	<ul style="list-style-type: none"> • Innovation • Resource intensity • Composition of material input

- Consumption patterns
 - Food & drink
 - Housing
 - Leisure
 - Transport & communication
- Demography
 - Ageing society
 - Population growth
 - Population density
- Natural system conditions
 - Climate
 - Topography & geology
 - Natural catastrophies

The question at the workshop will be which of those underlying factors have a significant influence on the activities. and whether additional factors have to be considered as relevant.



The output of the workshop will be a mind map for each topic field showing the *most relevant activities* and the *most important of their underlying drivers*. In a further step, these results will allow to identify cross-cutting drivers.