The EU Thematic Strategy on the sustainable use of natural resources against the background of system theory

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On 21rst December 2005 the European Commission proposed the Thematic Strategy on the sustainable use of natural resources (TSURE). The strategy consists of the communication COM 2005 (670) with 22 pages and an annex with 16 pages. Both communication and annex contain a number of proposals which need to be regarded as whole in order to understand the logic of the strategy. One might also consider in the context of policy integration the Commission's communication "External Action: Thematic Programme for environment and sustainable management of natural resources including energy"[2].

The European Commission proposes in the TSURE three strategic components:

1. Knowledge gathering;
2. Policy assessment;
3. Policy integration.

The objectives and measures for eventually integrating resource management in other policy areas will be based on the first preceding steps. For these preceding steps the EC proposes to set up:

1. by 2008, indicators to allow the setting of targets for reducing environmental impacts in the next 5-10 years;
2. 12 months after the strategy's adoption a European Data Centre on natural resources. The Data Centre would analyse, monitor and provide information for decision-makers;
3. "Soon after the strategy's adoption" a High Level Forum consisting of senior officials of Member States, the Commission and, as appropriate, representatives of other stakeholders;
4. in cooperation with the United Nations Environment Programme (UNEP) an International Panel on the sustainable use of natural resources.

In addition to these new institutions, the Commission proposes to integrate the lifecycle approach of the TSURE into other EU policies. These policies are supposed to be on the one hand existing and emerging environmental policies such as the Thematic Strategy on the Prevention and Recycling of Waste, non-legislative approaches such as the Integrated Product Policy (IPP)[3] or the Environmental Technology

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[2] COM (2006) 20

[3] COM (2003) 302

Action Programme[4] (ETAP). On the other hand, the European Commission puts the lifecycle approach of the TSURE in the context of integrating environmental considerations in other non-environmental policies e.g. the EU transport and energy policy or the Common Fishery and Agricultural Policies (CFP and CAP). Finally, the EC mentions in the context of policy integration also sectoral initiatives under the EU Strategy for Jobs and Growth, together with initiatives announced in its communication on industrial policy[5].

1. The strategic function of the TSURE

The Thematic Strategy for the Sustainable Use of Resources is a political follow-up of the 6th Environmental Action Programme (6EAP). Especially with regard to target-setting it is worth while to consider the strategic connection between both documents.

The 6EAP was meant as a strategy document subject to co-decision by the European Parliament, the European Commission and the European Council. There are formal requirements for monitoring and evaluation by the co-deciding bodies. This is also important with regard to the implementation deficit which is a persistent problem of environmental policy-making in the European Union. Nevertheless, the obliging status of the 6EAP has been more or less compensated by the lack of concrete and quantitative targets. Already during the drafting phase the lack of targets and timetables was subject to criticism of governmental and non-governmental stakeholders. Environmental NGOs, the European Consultative Forum on Environment and Sustainable Development, the European Economic and Social Committee, the European Parliament, and even national governmental bodies like the German Federal government and the German Bundestag remarked the lack of binding targets and time tables. The German Federal Advisory Council on the Environment (SRU) interpreted the 6EAP as an expression of the European Commission's intention to move away from target-oriented environmental policy (SRU 2002).

While being criticized for its lack of binding targets and timetables the 6EAP laid the ground for an EU resource policy. When presenting the 6EAP the European Commission already indicated the future direction in its press release (CEC 2001): "Improved resource efficiency will be the *leitmotiv* of a thematic strategy on the sustainable use of resources – another area where the 6th Environmental Action Programme will break new ground. As in other areas, the Commission believes that high environmental objectives in this respect will not least promote the competitiveness of European industry". The responsible Commissioner Wallström promised: "This will help business, with lower costs and new markets, consumers, who have less waste to dispose of and, of course it will help the environment".

The European Commission set up the 6EAP as a strategic and long-term framework of its environmental policy. For this purpose the question of setting targets had been of secondary concern. The press release

[4] COM (2004) 38

[5] COM (2005) 474

by the European Commission issued January 24 2001 quotes the responsible Commissioner Wallström: "For me it is important that we discuss concrete actions that will start things moving rather than spend much time in debating what the specific target figures should be. (…) We will set quantified targets later on the basis of more scientific information than we have at the moment" (CEC 2001). Concrete targets and timetable should not be set in the action programme itself, but in so-called "Thematic Strategies" which were due approximately five years after the formulation of the 6EAP. The chosen approach is not a policy in itself, but the promise of a "coherent policy focused on achieving an overall decoupling of resource use from economic growth"[6]. Consequently, as a first step, the development of a Thematic Strategy on the Sustainable Use of Resources, especially non-renewable resources has been the essential objective of the 6EAP in the area of resource management. The Thematic Strategy should meet two objectives:

- "establish a consistent analytical framework to identify criteria for setting priorities and
- undertake the necessary analysis and data collection in order to identify which resources are of most concern" and "identify and implement specific policy measures"[7].

Although the aim of delivering a Thematic Strategy has been met formally, the European Commission did not meet the political objective of establishing an analytical framework which would allow priority setting. Although the Commission initialized research in order to identify resource areas with impacts of most concern (Van der Voet et al. 2005) it was not able to identify and implement specific policy measures.

In the chapter "Meeting the challenge – the strategy's objective" the European Commission states explicitly: "At this initial stage, this strategy does not set quantitative targets for 'resource efficiency and the diminished use of resources' as prescribed by the Sixth EAP because it is not possible to do so with the current stage of knowledge and state of development of indicators. Neither the data underpinnings nor the indicators allow targets to be set that would clearly serve the purpose of reducing environmental impacts in a growing economy. The strategy does, however, set a process in motion whereby this could be possible over the course of the next five or ten years"[8].

The European Commission is deliberately postponing the target-setting, which was promised by the Commission when it had presented the 6EAP, to the next 5 to 10 years. Without target-setting, however, a policy-cycle can hardly be set in motion. Without precise and intelligible targets and timetables the EU will not be able to identify priority areas, derive sectoral objectives or choose priority measures. This will impede policy integration. Also the assessment of policies will lack clearly defined points of reference. In essence, the Thematic Strategy for the Sustainable Management of Resources is rather the starting point of a process which could lead to something that could be called an effective strategy. In other words, like other parts of the 6EAP natural resource management runs the risk to be "drowning in process" (Pallemaerts et al. 2006).

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[6] ibid
[7] ibid
[8] COM (2005) 670

2. The challenge of integrating resource management in EU policies

Sustainable management of natural resources cannot be regarded as being primarily an environmental responsibility. In fact, conventional environmental policy would not be able to implement policies which could assure a sustainable use and management of natural resources, because natural resources are traditionally managed under the responsibility of other policy sectors. Sustainable resources management is a cross-sectoral challenge which is targeted at the material basis of industrial economies. It will require nothing less than the complete review and structural change of modern production and consumption patterns.

Industrial societies fuel their economic development by using a number of renewable and non-renewable resources. Renewable resources are being produced by nature's vast regenerative potentials which could be an inexhaustible source of material wealth. Yet, for using renewable natural resources in a way that they can regenerate certain rules need to be respected. These rules are different according to the properties of the resource. For example, living resources like fish or forests have biological population dynamics. They can be vulnerable to overexploitation and other influences disturbing their natural regeneration. Other renewable resources are non-biotic elements like wind or water. They are basically indestructible, but have also chemo-physical dynamics that determine their usability as resource.

In addition to renewable resources the metabolism of industrial societies is largely based on the consumption of natural resources which are non-renewable. Non-renewability of resources usually implies that natural regeneration cycles exceed human time dimensions. For example, the renewal of fossil fuels or soils is much slower than anthropogenic use and management cycles. Because of the natural limitations and due to negative environmental impacts connected to extraction and use of non-renewable resources, sustainable use and management of non-renewable resources need to be based on reduction, recycling and substitution. Where necessary, the use has to be reduced to such an extent that future generations of a larger world population will be able to cover their needs and are not burdened with negative environmental impacts. Options to reduce the consumption of non-renewable resources include a prolongation of their lifecycle, by maintenance and recycling. Substitution of non-renewable resources by renewable resources can also be an option (e.g. substituting fossil fuels by biofuels), but it is limited by the reproductive capacities of nature and the available space to produce renewable resources.

Sustainable resource management affects all policies which are based on the exploitation of natural resources. The determination of natural limits to their use should be the basis for evaluating the fragmented political regulations on the management of natural resources. For a number of non-environmental policies of the European Union this would probably require an intensification of the efforts to integrate concerns of sustainable resource management. Concerning biotic resources this would affect policies like the Common Fisheries Policy (CFP), the Common Agricultural Policy (CAP) or the EU Forest Strategy. Concerning abiotic resources (such as fossil fuels, construction materials, metals etc.) policies which influence infrastructure and industrial development would have to be addressed. In this context energy policy, industry policy as well as EU-Regional Policy need to be considered (Schepelmann 2005). Also cross-cutting

policies for major resource groups need to be further developed (e.g. the EU biomass strategy, and future EU strategies on metals and construction minerals).

3. Social systems and their responsiveness towards sustainability

Integrating geological and ecological information about natural resources and the limits of their exploitation in the policy-cycle of major EU-policies is a communication problem which requires further contemplation of social systems and their responsive behavior. Compared to the scientific literature on generating scientific information the amount of sources on integrating this information into planning and decision-making is relatively small. One of the reasons for this might be scientific preoccupation with the "core competence" of data gathering and processing as opposed to policy assessment, which is often considered to be "political" and "unscientific". Another reason could be the complexity of political processes. Policy-makers would have to understand the implications of that information, integrate it, and allow trade-offs and compromise. This requires intensive communication between the sectors (horizontally) and often between the multiple levels of governance (vertically between local, regional, national and European levels). It can create substantial problems, because rational communication, learning and adaptation cannot necessarily be assumed. Stakeholders are usually representatives of rationalities which are not scientific (but economic, political, juridical, ethical, etc). Lack of response to scientific communication can block information. Thus, environmental policy integration (EPI) becomes a communication problem.

A driving-force for environmental policies is the perception of social risks which are connected to the destruction of ecological functions. Society tends to look away when problems arise, which results in a state that Hans-Jochen Luhmann (2001) refers to as „blindness of society". He has studied a number of scandals and man-made catastrophes which had a negative impact on man and nature although they could have been avoided with precautionary action. Luhmann explains how social systems tend to isolate and suppress warnings and writings on the wall. According to him a central reason for this is the social division of labour. "Obviously the blindness of society is connected to the blindness of the expert for cross-cutting issues" (ibid., p. 13, own translation). He sees a pattern of ignorance which is fuelled by the desire not to be responsible for the "greater good" and the chance to limit ones attention to a core-competence. This can have the consequence of suppressing warnings and alarm. Luhmann illustrates this with the example of the BSE-crisis. Apparently, decision-makers did not insist on a thorough problem analysis and solution, because they were afraid of being held responsible for the negative economic impacts on the European beef market. Luhmann describes the twilight zone of uncertainty and irresponsibility that characterizes precautionary policy. Can precautionary interventions against policies driven by powerful economic interests be justified, if their negative impacts are not proven?

The European Environment Agency has issued an impressive collection of examples, which illustrate that the apparent irrational suppression of risk information is part of the rationality of modern society. The

documentation "Late lessons from early warnings" (EEA 2001) is a history of suppressed precaution in the light of division of labour and economic rationality.

The apparently widespread pattern of suppressing scientific information indicates a general behavior of social systems, which has been described by Niklas Luhmann in his the sociological system theory (1981, 1989, 1994, 1997). Sociological system theory is therefore highly relevant for environmental policy integration, because it explains the following system properties:

- The tendency of social subsystems of delineation, closure and selection of information and;
- The conditions for environmentally relevant communication.

Niklas Luhmann (1990) describes the perception and processing of environmental risks by modern societies as "ecological communication". His theory defines the "blindness of society" as a constituting system property, because any system can only exist, if it delineates itself against its environment. Systems demarcate borders between inside and outside. Thus they constitute themselves (inside) and their environment (outside). Social systems do this by means of communication. According to Luhmann is society the ensemble of all relating communications. "*Society is nothing but communication, and by continuous reproduction of communication by communication it delineates itself against its environment and other systems. This way evolution builds up complexity*" (Luhmann 1990, p. 24, own translation).

Luhmann explains the perception by social systems with their so-called resonance. Resonance is based on the fact that systems can only react on the environment according to their own structure. The structure and thus the resonance of a social system are determined by their functional differentiation. Functional differentiation describes the development of systems within systems (subsystems) that is the differentiation of a society into social sectors. The differentiation is called functional, because the identity of the subsystem is defined by the function for the overall system (society).

Functional differentiation is autopoetic. The individuals reproduce each other by networks and delineate themselves by communication from the environment. This distinguishing communication is happening by a functionally adapted coding of reality. Differentiated systems perceive reality not "holisticly", but only its functionally important aspects based on a system-specific coding. The selection of information results in a higher order within the system, cohesion and the ability to reproduce. Examples for such a functional differentiation is the increasingly complex development of law, but also specialization of scienctific communities with their specific languages (Stichweh 1979).

The differentiation of society increases the selectivity of perception and in consequence decreases the possibility of a response towards (unspecific) environmental information. Thus, the system theory by Niklas Luhmann offers an explanation for the above mentioned "blindness of society" described by Hans-Jochen Luhmann (2001) or the "institutional unwillingness" mentioned by Glasson and Gosling (2001) in the context of environmental impact assessment. Niklas Luhmann denies the simple but tempting precautionary notion that there are facts on which society has to react, in order to avoid damage. Niklas Luhmann rather asks in which scheme facts are recognized, which desired states relate to a perception and

how expectations can meet what appears in relation to them as reality. Obviously information about physical limits to or negative impacts of a desired project, program or policy is intelligence, which is not necessarily welcomed by decision-makers and managers.

System theory itself is an observation of a functionally differentiated system. Evidently, this observation happens from a point of view with its own systemic context. Luhmann refers to such an observation of a system by another system as cybernetics of second order. Without these cybernetics of second order a scientist cannot understand why "important" scientific information often does not meet any social response. He will not be able to realize that scientific information (e.g. about negative impacts of climate change) has within the context of many social systems no value at all. Cybernetics of second order is highly relevant for applied sustainability science, because certain system cannot see what they cannot see. It explains that in spite of or even because of the large number of specialists, expert groups, agencies and an enormous growth of scientific knowledge about ecological risks it is more and more unlikely that society as a whole can control special interests that drive ecological self-destruction.

Functional differentiation is a process which dominates all modern societies. With communication amplified and accelerated by modern information technologies, this will increase exponentially in spite of antagonistic movements (e.g. by totalitarian or fundamentalist ideologies). Functional differentiation is a profound challenge for resource management, because a consensus about what relevant environmental problems are and how they could be prevented or solved is more and more unlikely.

Since the 1990ies a social movement has rallied around the theme of sustainability. This could be interpreted as a counter-reaction against functional differentiation by attempting to harmonize economic, ecological and social coding (Valentin/Spangenberg 2000). Numerous round tables, advisory councils, and Local Agenda 21 groups have formed. The Cardiff-Process on environmental policy integration of the EU could be seen as administrative counterpart of this social movement by trying to balance antagonistic sectoral interests under the roof of sustainability. As we know now, more than 20 years after the publication of the Brundtland report the success of the sustainability movement has been limited. Also the Cardiff process can be considered as having been overruled by the special interests of different administrative sectors (Schepelmann et al. 2000, Kraemer 2001). Based on these experiences any strategy for sustainable resource policy is likely to fail, if the concerns formulated by Niklas Luhmanns are not properly addressed, by the following considerations:

Resource management does not rule out the suppression of information. The communication of every social system is based on the selection of information. If it would not select information it would be limitless and thus identical with its environment (universal). Incompleteness by selection of information is therefore constitutive for every social system (including resource management systems). The suppression of information will become dysfunctional "blindness", if the suppressed information is related to risks which are needed to maintain the integrity and reproduction of a system. From a system theoretical point of view the possibility of jeopardizing survival due to ecological unfitness does not sufficiently motivate adaptation:

„Ecological self-destruction is therefore indeed a possibility of evolution. Risky situations do not only occur because a high degree of specialization turns out to be unfit when the environment changes. It is also a possibility that a system impacts as much on its environment that it can no longer exists.

The primary objective of autopoetic systems is always the continuation of autopoesis disregarding its environment, and therefore, the next step is typically more important than caring for the future, which is not attainable, if autopoesis cannot continue".

After this explanation Niklas Luhmann (ibid. p. 39) points out the central problem:

„To the degree to which technical interventions alter nature resulting in negative impacts for society, not less but more intervention competence needs to be developed. However, this competence needs to be applied according to criteria, which integrate social rebound effects.

The problem is not causality, but the selection criteria. The question which emerges from this is twofold:

1. *Is technical competence sufficient for a selective behavior that means: will there be enough freedom from natural constraints? And:*
2. *is the communication competence in society sufficient for operationalizing the selection?"*

The first question whether a selection of sustainable intervention would leave enough freedom from nature has been answered positively by different authors (Von Weizsäcker 1995, Schmidt-Bleek 1994, Carley and Spapens 1998). It is the logical prerequisite and optimistic foundation of any constructive transition towards sustainability. The second question is still largely unanswered and addresses the central challenge of sustainable resource management: How can communication be improved in a way that communicative competence of social systems for a sustainable management of natural resources increases?

Against the background of sociological system theory the strategic components of knowledge gathering, policy assessment and policy integration of the TSURE could be interpreted as a program to improve systematically the competence of social systems. In the following section the European Commission's proposals will be presented and discussed whether and how they could contribute to increasing the communicative competence of social systems for a sustainable resource management.

4. The EC proposals

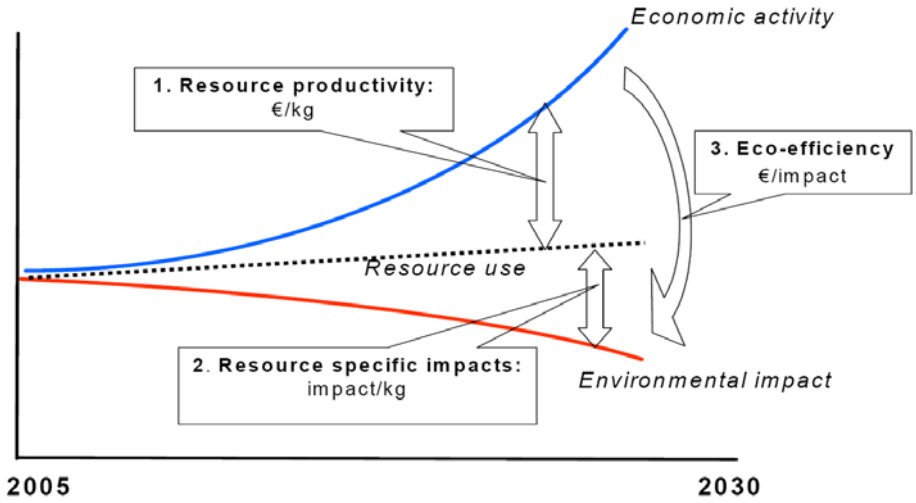
In contrast to the expectations raised in the 6EAP the Thematic Strategy itself does not propose to implement any specific policy measures at all. It remains a scheme for establishing a consistent analytical framework in combination with new political institutions for information gathering, prioritisation and discourse. Thus it can be interpreted as a strategy for agenda-setting and "ecological communication" (Niklas Luhmann) rather than a political action programme for changing production and consumption patterns. In the TSURE the European Commission proposes three strategic components of knowledge gathering, policy assessment and policy integration. The components are steps in a logical sequence which could lead to effective measures for integrating principles of sustainable resource management in policies which are based on the exploitation of natural resources. Yet, it needs to be stressed that the only concrete output of the TSURE will be in the short to medium term institutions of data gathering, processing and discourse:

1. indicators to allow the setting of targets for reducing environmental impacts;
2. a European Data Centre on natural resources;
3. a High Level Forum;
4. an International Panel on the sustainable use of natural resources.

In the following the European Commission's proposals will be analyzed, how they could contribute to increasing the communicative competence of social systems to manage resources sustainably.

Indicators

Instead of presenting targets and timetables with operational indicators, the Commission promotes an abstract concept of eco-efficiency. This does not primarily aim at using resources more efficient by decoupling *resource use* from economic growth, but at decoupling *environmental impacts of resource use* from economic growth. Figure 1 illustrates the difference of the two decoupling approaches and their combination in the TSURE. The top curve represents economic growth. The dotted line represents resource use which grows much slower than the economic activity. The relation between economic activity and resource use is called resource productivity. The curve at the bottom represents the decreasing environmental impacts. The relation between the use of resources and impacts express the resource specific impact. According to the EC definition eco-efficiency comprises both relations of resource productivity and resource-specific impacts by expressing the ratio between economic activity and the impacts of resource use ("double-decoupling").



Source: COM (2005) 670

Figure 1: Decoupling economic activity, resource use and environmental impact

Based on this concept, the Commission proposes to define indicators by 2008, which would allow the setting of targets for reducing environmental impacts in the next 5-10 years.

It could be argued that operational indicators for reducing overall environmental pressure from resource use already exist. The European Commission does not explain why it does not propose a target-setting for improving resource productivity (decoupling resource use from economic growth) on the EU level. This would be in line with resource productivity targets already established in a number of different EU Member States (EEA 2005). Instead of defining the already operational objective of improving resource productivity, the EC postpones its target-setting in favour of a long-lasting quest with uncertain outcome. If the maximum time suggested by the EC would be used, the Commission would conclude its target-setting in 2015, ten years after the publication of the TSURE. Counting from the publication of the 6EAP the EU would have altogether used almost one and a half decades for defining targets in the area of sustainable resource use. This postponement seems inadequate given the availability of operational indicators and the urgency of change for environmental and socio-economic reasons. Nevertheless, the EC seems to be determined to develop indicators for operationalizing its eco-efficiency concept (double-decoupling). A possible compromise between the need to define political targets and the desire to know more about resource use and its environmental impacts seems to be obvious: While operational targets for reducing overall resource use and increasing resource productivity of the EU could be defined immediately, research could be dedicated to further assess the impacts of specific material use. Research and statistical harmonisation in the EU and EU Member States could thus proceed along two main lines:

1. Quantification of overall resource use in the EU and its Member States: Improvement of European and national statistics of economy-wide material flow accounts[9] for regular monitoring of resource consumption and productivity.

[9] Operational indicators already used by EEA and Eurostat inlcude Total Material Requirement (TMR)/ Total Material Consumption (TMC) and Domestic Material Input (DMI)/ Domestic Material Consumption (DMC).

2. Assessment of impacts of resource use: Further harmonisation of material flow accounting and lifecyle-wide impact assessment of specific resource consumption.

These two research lines suggested above could be implemented in the upcoming 7th EU Research Framework Programme and national research programmes.

Data Centre

The TSURE acknowledges that information about resource use is not centrally compiled, but that it is provided by a number of governmental and non-governmental institutions and agencies. Therefore, the EC has proposed to establish an 'information hub' bringing together all available, relevant information for monitoring and analysis and for providing policy relevant information to decision-makers[10]. The Data Centre is supposed to be operational 12 months after adoption of the Thematic Strategy. The establishment of an information hub could be accelerated by taking advantage of existing expert networks for resource accounting and management (e.g. the European Topic Centre on Waste and Resource Management[11] or the ConAccount network for Material Flow Accounting[12]).

Functions of the Data Centre will be to:

- develop and consolidate suitable indicators for measuring the strategy's progress,
- assist Member States in the development of actions plans,
- support for the International Panel, and
- every five years, starting in 2010, to draft a status report on the implementation of the strategy.

High Level Forum

The High Level Forum has the strategic function of "policy assessment" and "policy integration". It should consist of "senior officials responsible for the development of natural resource policy in the Member States, representatives of the Commission and, as appropriate, consumer organisations, environmental NGOs, industry, academia and other stakeholders with specific interest and expertise in the issues at hand"[13]. The Forum is supposed to be created "soon after the strategy's adoption"[14].

The TSURE hardly suggests any policy measures apart from a list in annex 5. It suggests that "many of the actions needed to implement this strategy can be best taken at national level", because "aside from agriculture and fisheries, most natural resource policies do not fall under exclusive Community competence". If the High Level Forum materializes it is likely to start with a discussion of targeting. It remains to be seen

[10] COM (2005) 670
[11] http://waste.eionet.europa.eu
[12] http://www.conaccount.net
[13] COM (2005) 670
[14] ibid

whether the Forum will have the appropriate resources to make progress in the direction of policy assessment and integration.

International Panel on the Sustainable Use of Natural Resources

The description of the International Panel in annex 6 is the most detailed of all institutions under the TSURE. It is supposed to be set up in cooperation with the United Nations Environment Programme (UNEP). The objective of the Panel will be "to provide independent scientific advice to the EU, interested governments and international organisations on the key environmental impacts of the extraction and use of natural resources in a lifecycle perspective and on approaches to reducing these impacts, aimed at decoupling environmental impacts from economic growth. The Panel will also provide advice and support to capacity building in developing countries in relation to resource extraction and use in a lifecycle perspective"[15].

The material flows of the EU are embedded in the international flows of goods of globalized production and consumption patterns. Via the outsourcing of resource extraction and resource-intensive production the EU is already shifting environmental burden to other world regions. Therefore it is appropriate to create such an international forum of research and discourse accompanying further pursuit of TSURE. It is possible that this International Panel might also successfully fulfil a role of agenda-setting and consensus building.

[15] ibid

5. From knowledge gathering to policy integration

The European Commission's proposals suggest that on the basis of information gathering and policy assessment, policy integration is the end goal of the TSURE. In the light of the failure of the Cardiff Process on environmental policy integration (Schepelmann 2000, Kraemer 2001) it is perhaps the most difficult task of the TSURE.

The challenge of horizontal policy integration is complex, because a sustainable management of natural resources would affect a multitude of non-environmental policies. For biomass the most relevant EU policies include the Common Agricultural Policy, transport and energy policies, the Common Fishery Policy, the EU Forestry Strategy, the biomass action plan and the biofuels strategy. For abiotic materials policies include the industry policy, transport and energy policy or the EU Regional Policy. A number of environmental policies are also affected such as the Integrated Product Policy (IPP), the Thematic Strategy for the Prevention and Recycling of Waste or the Environmental Technology Action Programme (ETAP). Changing material flows of the EU (e.g. by reducing toxic flows) would also have considerable consequences for the EU's chemicals and health policies.

A recent illustration of how difficult the integration of resource management in other policy areas can be is the EC Communication on the "External Action: Thematic Programme for Environment and Sustainable Management of Natural Resources including Energy"[16], which was published only a few months after the TSURE. One would expect a close relation of the two communications especially concerning the International Panel and the global implications of the strategic objectives suggested in the TSURE. Nevertheless, references can hardly be found and links are only very general supporting other environmental policy domains like climate policy as much as the emerging policy field described by the TSURE. Clear and intelligible targets are a prerequisite to a better integration of resource management in other policies (Schepelmann 2000). If the objectives of a policy are not well communicated it will be difficult for other policy areas to relate to them. The postponement of target-setting by the TSURE could be a possible explanation why the Communication on the External Action scarcely relates to the TSURE. Nevertheless, there would be a number of obvious opportunities for external action, for example, knowledge gathering about EU traded goods, their ecological rucksacks and their contribution to shifting of environmental burden from the EU to other regions (Schütz et al. 2004). The International Panel could also be regarded as an important external action. Nevertheless, despite their similarities in the title both EC communications have little to do with each other. It can be expected that decision-makers in other large EU policies such as the Common Agricultural Policy (CAP) or the EU Regional Policy will not be inspired to support the TSURE with more convincing contributions.

This brings us back to sociological system theory in order to define the central challenge for the Thematic Strategy on the sustainable use of natural resources: How can communication be improved in a way that

[16] COM (2006) 20

the communicative competence of non-environmental policies for sustainable resource management increases?

The answer to this question requires the consideration of another question: Why should other than environmental policies integrate principles of sustainable resource management? One might be tempted to assume, that other sectors need to integrate ecological information, because experience has taught also actors beyond environmental policy that ignoring physical limits can imply damage, but sociological system theory as well as the actors-oriented governance theory stress that voluntary learning is not something to be counted on. While system theory sees the reason for this in the specific modes of operation, actors-oriented theories explain this with the institutional restrictions and special interests of social actors. The normal attitude of social systems and actors towards integrating information about their physical limits seems to be an "institutional unwillingness" (Glason and Gossling 2001). Therefore sustainable resource management has to be based on more than good data gathering and processing. Based on Benz (1998) who developed elements of a controlling theory, this would be:

- a clear political mandate,
- power to enforce its objectives and
- a suitable institutional basis.

According to Benz management competence can have varying degrees: it can be a simple mandate for approval or disapproval up to the power of inflicting negative or positive sanctions. A political mandate is the prerequisite for the ability to use power which is based on resources (personnel and finances) and political support. To this end resource management should be based on an appropriate institutional framing. In this context structures of communication and cooperation allowing institutional learning are more important than hierarchy.

It is unrealistic to suggest that the TSURE could be implemented by a central organisation with a strong political mandate by imposing management rules for the sustainable use of natural resources upon public and private user of natural resources. It is probably more realistic to assume that institutions proposed in the context of the TSURE will have rather a monitoring than a controlling mandate. Therefore alternatives to hierarchical relations to resource user communities need to be considered which would allow communication, cooperation and institutional learning.

Resource management systems are very diverse, but there are probably only few cases where sustainable resource management is institutionalized with a political mandate and sufficient power. Resource management systems can be private, public or both. They can be organised on local, regional, national and international level. For example, in some regions water management is organised by local user communities, the use of some mineral resources is primarily managed by large transnational corporations, while forests can be managed by private owners or public administrations. The diverse user systems are accompanied by an array of public as well as private expert and research institutions. They can have the function of providing knowledge for limiting or maximizing exploitation of natural resources.

In view of these different user and expert communities the competence to manage resources depends on the natural resource and the specific governance structures. A political strategy for increasing the communicative competence for sustainable resources management will therefore have to take into account not only the different bio-physical properties of a resource, but also the socio-economic properties of user and expert communities.

The institutional proposals of the TSURE (Data Centre, High Level Forum, and International Panel) could play a role facilitating sustainable resource management by exploring the complex landscape of the different resource user and expert systems and by collecting and coordinating their knowledge. While the development of indicators and the establishment of a Data Centre are meant to improve data gathering and processing, the High Level Forum and International Panel could be interpreted as institutions for agenda-setting and EU-internal and external communication. Problem formulation, target-setting and maybe even the assessment of policy options could be seen as an output of the interaction between all three organisations.

In absence of the competence to control and regulate user systems the effectiveness of resource management will be primarily based on its capacity to make offers attractive for the development of the respective resource user system. The quality of these offers is decisive for the effectiveness of its impact on other policies. This could be data in adequate timely and spatial resolution, but also attractive opportunities for supporting research, development and learning. Remarkable in this context is the EC proposals for setting up a High Level Group on Competitiveness, Energy and the Environment for bringing together the Members of the Commission for Enterprise and Industry, Competition, Energy, and the Environment as well as all relevant stakeholders. One of five task of the High Level Group would be the improvement of resource efficiency and the uptake of environmental and other innovative technologies. This could support the integration of resource management in industry policy in the framework the EU Lisbon Strategy[17]. The proposed European Technology Platform on Sustainable Mineral Resources promoting sustainable development in the non-energy extractive industry could be an interesting test case for increasing the communicative competence of user systems for sustainable resources management.

6. Research Outlook

In order to maximise the effectiveness of the Thematic Strategy for the sustainable use of resources in general and in particular in preparation of an institutional framework and workprogramme for the Data Center, the High Level Forum and the International Panel it would be worth while to think about how they relate to the different resource user und expert groups. The above mentioned functional differentiation of society and policy will require specifically tailored communication strategies in order to make the

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user and expert systems more receptive for the objectives of sustainable resource use. This leads to the general problem of integrating environmental information in non-environmental communication systems. In this context the design of the TSURE and its institutions could profit from experience and research.

In the EU experience has been made with different environmental advisory bodies, for instance the European Consultative Forum for Environment and Sustainable Development or the European Environmental Advisory Councils (EEAC).

The European Consultative Forum on the Environment and Sustainable Development had been established in 1997 by the Commission Decision 97/1 50/EC in order to advise the Commission on aspects of both sustainable development and environmental policies. The Forum had been discontinued in 2001. The Forum included 32 members appointed by the European Commission from the European Economic Area (EEA) and the associated countries of Central and Eastern Europe. Its members represented the business world, regional and local authorities, professional associations, unions and environmental protection and consumer organisations. The members were appointed for a four-year period. The Forum published positions paper and press releases and organized meetings and conferences on a number of different topics including environmental policy integration, employment and environment, spatial and land-use policies, Integrated Product Policy, EU enlargement and environment, the EU Environmental Action Programme, governance and sustainability as well as nuclear safety.

The Consultative Forum's self-assessment (ECFESD 2001) concludes that there is indication that it had an impact on EU policy-making, but that its influence was limited by an unclear mandate and lack of the European Commission's support. Especially the access to relevant decision-makers in the Commission and other institutions and a continued exchange on the topics at issue had been difficult. Political and budgetary dependence and the voluntary mandate of its representatives also had been mentioned as factors limiting the effectiveness of the Consultative Forum.

In addition to the Consultative Forum as an EU institution of knowledge gathering and advice, national and regional environmental advisory councils have been associated in the European Environmental Advisory Councils (EEAC) network[18]. The bottom up co-operation between advisory councils started in 1993 and has lead to a network of more than 30 councils from 20 European countries. The individual councils with the mission to advise national and regional governments are statutory bodies of the EEAC-network. They are organised as councils for providing expertise but also include bodies managing stakeholder dialogue.

In contrast to the Consultative Forum the EEAC did not received an official mandate to advise any EU institutions. Nevertheless, they publish position papers on different EU policies. The EEAC member organisations have different advisory functions on national and regional level. The experience of these

[18] http://www.eeac-net.org

different councils could be a valuable source for identifying criteria for successful institutions of knowledge-based policy advice and communication.

In addition to making full use of the experience within Europe the design of the TSURE institutions could be improved by taking into consideration existing research. The relation between scientific advice and policy-making has been considered by various authors (e.g. Castells and Ravetz 2001; Christoffersen et al. 2000; Harrison and Bryner 2003, Schreurs et al. 2001). With regards to the TSURE relation between institutions of knowledge gathering and policy assessment might be considered. For example, Farrell and Jäger (2006) have tried to answer the question of how environmental assessment processes could be designed in such a way that scientific and engineering knowledge were most likely to improve decision-making.

Their finding are based on research by Cash et al. (2003), which assessed a number of knowledge systems for sustainability most of them in the context of the exploitation of natural resources including knowledge systems for enhancing agricultural productivity, the management of aquifer depletion and the planning of ocean fisheries.

The presented general observations and recommendations could also be applied in the context of the three strategic components of the TSURE of information gathering, policy assessment and policy integration. From a system theory perspective their approach implies that environmental assessment is a separate communication system, independent from either the scientific or the political system. It can be distinguished by its own features, norms of behaviour, and limitations. Farrell and Jäger distinguish three major system attributes that seem to make it more likely that assessment systems can successfully contribute to the integration of environmental information in non-environmental systems: salience, legitimacy, and credibility. They are not functional properties of the knowledge systems themselves, but they are attributions made by other systems (see above Luhmann's cybernetics of second order). Thus to be functional, system designers and participants must understand how to encourage other social systems to perceive the communication of their system as being salient, legitimate, and credible.

Applied to the TSURE and its institutions the crucial job for those who design and manage the planned policy assessment and integration processes is to balance efforts to enhance salience, legitimacy, and credibility: "For instance, credibility can be maximized by addressing only questions in which scientific certainty is high or by allowing only the most renowned scientists to participate, regardless of the nation or sector they represent. The problem is that in the former case, the assessment risks losing salience by failing to ask what decision-makers want to know, and in the latter case it risks losing legitimacy by failing to take the interests of potential users into account. Similarly, decision-makers may be more likely to receive advice salient to their interests by ordering an in-house assessment, but the results are not likely to have much legitimacy with others in the issue domain" (Farrell and Jäger 2006, p. 10).

Also what Farrell and Jäger consider as so-called fatal flaws is strongly connected to the attributes of credibility, salience, and legitimacy. These fatal flaws could also be crucial in the context of the TSURE knowledge gathering, policy assessment and integration.

Farrell and Jäger identify the lack of scientific credibility to be the most frequent fatal flaw for assessments. "Credibility can be lost through inadequate quality control over technical arguments, unresolved disagreements over what constitutes appropriate standards of evidence and argument, or the appearance of substantive discrepancies between the body of an assessment report and its executive summary" (Farrell and Jäger 2006, p. 11). In the case of the TSURE an example for an unresolved disagreement about standards of evidence and arguments is the ongoing debate on indicators, targets and timetables. While the European Commission repeatedly insisted that there is insufficient data for setting targets and defining indicators, others argue that data and indicators are already operational for immediately setting targets and timetables (Schepelmann et al 2006).

If assessments are credible they can still suffer from a lack of salience. "Most importantly, salience can be lost by assuming that the questions important to the scientific community are the same as those important to the policy community, when in fact they are not" (Farrell and Jäger 2006, p.11).

Probably not only in the context of the TSURE the questions of salience cannot be answered by science, but only in a process in which representatives of both the scientific as well as the political system are involved. Candidates for salient aspects of the resource debate are most likely security of supply, economic efficiency gains, impacts of resource use, resource conflicts and equity issues.

The postponement of the European Commission is also connected to another fatal flaw risking salience of an assessment which occurs when it is delivered too slowly to play a meaningful role in a policy process.

Especially in the context of the International Panel the failure to secure political legitimacy needs to be considered. According to Farell and Jäger this most classically occurs when poorer countries perceive that they have been left out of a process largely run by a few wealthy nations. Legitimacy of the International Panel could also be improved, if the EU and UNEP could involve UN institutions relevant for managing natural resources.

With a view to the different resources as well as their respective user and expert systems another fatal flaw needs to be highlighted with special emphasis: salience can also be lost by adopting a "one size fits all" approach to policy questions, instead of tailoring assessments to specific users.

7. Conclusion

The TSURE marks the beginning of a process of knowledge gathering, which could ultimately lead to policy assessment and policy integration. The European Commission's communication itself cannot be considered to be a full-fledged strategy with targets, timetables and specific measures that enable the European Union to achieve sustainable management of natural resources. It is rather the starting point of a communication process, which could set the agenda and prepare the definitions of problems as well as objectives of an effective strategy. From the perspective of social system theory the Commission's ap-

proach which focuses on communication seems to be a rational choice. Yet, it can be questioned whether this is sufficient. It needs to be stressed that, knowledge gathering, processing and communication will not necessarily lead to meaningful policy assessments and effective policy integration. There are pitfalls and fatal flaws to avoid when starting on the long and winding road towards a strategy, which is supposed to reduce negative environmental impacts of resource consumption. For assessing these pitfalls and fatal flaws, but also the opportunities of knowledge gathering, policy assessment and integration the European Union can learn from experience and research. This article tried to give examples of relevant theory, experience and research for emphasizing the need of a differentiated approach for knowledge gathering, policy assessment and policy integration of the TSURE. Especially the consideration of different properties of natural resources from algae to zinc as well as the diversity of private and public resource user and expert systems seems to be necessary in order to increase the likelihood of integrating successfully the principles of a sustainable resource management in non-environmental policies.

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