

Respecting environmental limits – A challenge for the 7th Environmental Action Programme

Recommendations by the German Advisory Council on the Environment

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Summary and recommendations

1. **The key challenge to be addressed by the 7th EAP is the threat of environmental limits being exceeded at different spatial scales. The 7th EAP should formulate a small number of clearly identifiable thematic focus areas** so that limited capacity can be successfully concentrated. In line with recent research, the priority issues of the 7th EAP should be climate change, biodiversity, nutrient overload, water scarcity, land-use changes and chemicals. These environmental issues should not be treated in isolation, but they need to be addressed in a way that acknowledges their complex interdependencies.
2. Environmental and climate policy are divided within the European Commission between two Directorates-General. One outcome of this somewhat arbitrary organisational arrangement is inadequate programmatic provision for interrelationships such as those between climate change and nature conservation. Because it was compiled under the leadership of DG Environment, the resource roadmap does not systematically address climate change. **The 7th EAP should ensure coherence between these two environmental policy objectives in particular to avert shifting problems from one issue to another.**
3. The 7th EAP can deliver a broader and more appropriate rationale than the efficiency-based approach taken in the resource roadmap. In particular, the formulation and observance of environmental limits certainly cannot be achieved exclusively via technological efficiency strategies. Developing an integrated strategy to respect environmental limits requires that environmental policy targets are revised and updated. **The 7th EAP should contribute to the development of such an updated and widened target system.**
4. Targets need to be formulated in a way that – in line with the precautionary principle – keep sufficient distance from environmental limits (e.g. planetary boundaries or the carrying capacity of ecosystems) and do not exceed Europe's fair share in global resource use. Given that the Commission has started very late with serious preparations for the 7th EAP, the preparation process for the 7th EAP itself cannot be expected to deliver this type of result immediately. **Nonetheless, the 7th EAP should provide the right frame for an intensified target setting process on the priority areas.** The work on the 7th EAP in this context can draw on the groundwork laid for the Roadmap with regard to target formulation and the conceptual framework. The European Environment Agency's State of the Environment Reports provide relevant information on limits exceeded, medium-term problem trends and action needed.

5. **Formulating, revising and updating medium and long-term targets requires the improvement of science policy interfaces, particularly for central thematic areas such as nitrogen input, land take and land use, water availability and maintaining the functioning of key ecosystems (e.g. oceans, forests and wetlands).** The IPCC (at global level) and the Clean Air for Europe programme (at European level) are good models for effective science policy interfaces leading to robust target formulation. A programme that merely documents previously agreed targets or only aims for better implementation of measures that have already been decided would fall short of what is required.
6. One of the central structuring challenges of the decade is the alignment of the EU budget to the conservation of environmental public goods and the investment in sustainable infrastructure. **The 7th EAP should contribute towards implementation of the target proposed by the European Commission in connection with the multiannual financial framework of spending 20 percent of the EU budget on climate-related expenditure.**

1 Introduction

In March 2012 the European Commission has launched a public consultation on the forthcoming 7th EAP. At the centre of this consultation are the priorities, themes and approaches of the 7th EAP.

On 4th of June 2012 the German Advisory Council on the Environment (SRU), an independent, academic council established by the German Federal Government, launches its Environment Report 2012 entitled "Responsibility in a finite World". This consultation response submitted by the SRU is based upon this report, which covers a wide range of environmental issues, amongst them environmental and sustainable development strategies as well as the green economy and the new limits to growth debate.

The SRU suggests to focus the 7th EAP on the EU's contribution to the global objective of keeping human development within planetary boundaries. This implies a vigorous renewal of a broad target setting approach, not least to define the EU's fair share in scarce global resources and sinks.

2 Key challenges to be addressed by the 7th EAP

2.1 The threat of crossing environmental limits

Environmental limits are being exceeded in the different areas and at different spatial scales, for example:

- With advancing climate change, sea levels are rising, glaciers are melting, extreme weather events are becoming more frequent and it is becoming increasingly likely that irreversible tipping points will be attained.
- Despite international negotiations and efforts, it has not been possible to slow biodiversity loss in the way the international community aimed to achieve between 2002 and 2010. Species loss continues unabated at several times the natural loss rate.
- Around 60 percent of assessed ecosystem services are already degraded or at risk from non-sustainable use. Forest cover is shrinking around the world, with tropical rainforests suffering ongoing, dramatic decline. Tropical coral reefs are collapsing. Overfishing of the oceans remains one of the biggest unresolved problems; around 80 percent of fish stocks in the world's oceans are already fished to the limits of their capacity or beyond.
- Global per capita available water supply is on the decline, notably due to overexploitation of ground and surface water resources. In future, more and more people will suffer from water shortage. Water pollution remains one of the biggest causes of death and disease around the world.

- Humankind already appropriates about one quarter of the Earth's potential net primary production – largely by harvesting biomass for the production of food, construction materials and energy, but also by using land for housing and infrastructure. Habitats and food supply for other species are thus significantly restricted by human activity.

All in all, these differing and in many cases mutually reinforcing transgressions of environmental limits put the livelihoods of hundreds of millions of people at risk. They have many impacts on environmental and social systems in that they cause food crises, exacerbate water shortages and heighten social the conflicts surrounding natural resources. Transgression of environmental limits can destroy habitats for people and animals and thus trigger migration and flight. As a result, they play a key role not just in environmental policy, but also in economic policy and security. Acute impacts are already visible, largely among the poorest sections of the population in developing countries, where livelihoods depend on the availability of local natural resources. The degradation of ecosystems is therefore also an obstacle in achieving the Millennium Development Goals.

Industrialised countries, by contrast, have so far felt hardly any direct impact. Losses of ecosystem services in Europe are less severe in many areas than at global level, partly due to environmental protection and nature conservation legislation and related measures. At the same time, European goods imports and greenhouse gas (GHG) emissions contribute to the damage caused to ecosystems in other countries.

Various global indicator systems show that environmental limits can already be assumed to have been exceeded. The most influential approach has been put forward by Rockström and collaborators who propose planetary boundaries for ten different natural systems and processes. **The planetary boundaries define the safe operating space for human activity, which in each case is far enough removed from potential tipping points or harmful impact levels.** Systems should remain within these boundaries in order to avoid abrupt, irreversible and catastrophic environmental change.

In the case of climate change, loss of biodiversity and impacts on the global nitrogen cycle, the authors believe the planetary boundaries are believed to already having been exceeded. Other pressures (the phosphorous cycle, acidification of the oceans, land use and fresh water use) are close to their boundaries.

Planetary Boundaries

Earth System Processes	Parameters	Proposed Boundary	Current Status	Pre-Industrial Values
Climate change	1. Atmospheric carbon dioxide concentration (parts per million by volume)	350	387	280
	2. Changes in radiative forcing (watts per metre squared)	1	1.5	0
Rate of biodiversity loss	Extinction rate (extinctions per million species per year)	10	> 100	0.1 – 1
Nitrogen cycle (part of a boundary with the phosphorous cycle)	Amount of N ₂ removed from atmosphere for human use (millions of tons per year)	35	121	0
Phosphorous cycle (part of a boundary with the nitrogen cycle)	Quantity of P flowing into the oceans (millions of tons per year)	11	8.5 – 9.5	-1
Stratospheric ozone depletion	Concentration of ozone (Dobson unit)	276	283	290
Ocean acidification	Global mean saturation state of aragonite in surface sea water	2.75	2.90	3.44
Global freshwater use	Consumption of freshwater by humans (km ³ per year)	4,000	2,600	415
Change in land use	Percentage of global land cover converted to cropland	15	11.7	Low
Atmospheric aerosol loading	Overall particulate concentration in the atmosphere, on a regional basis	To be determined		
Chemical pollution	For example, amount emitted to, or concentration of persistent organic pollutants, plastics, endocrine disruptors, heavy metals, and nuclear waste in the global environment, or the effects on ecosystem and functioning of Earth system thereof	To be determined		
Grey shading: Planetary boundaries have been crossed.				

Source: Rockström et al. 2009

Added to this are the systemic interrelationships between the various environmental problems. **These problems can no longer be seen as unrelated, but as a complex set of circumstances shaped by feedback mechanisms and non-linear interrelationships.** For example, the increased demand for biofuels, originally environment-driven, can lead to deforestation in developing countries and to the planting of biomass crops in monocultures. This results in the release of greenhouse gases, destroys habitats, impairs soil fertility, fosters erosion, and puts the livelihoods of indigenous populations at risk, thus triggering considerable social conflict. Loss of biodiversity is one example of a highly complex environmental problem whose causes are rooted in numerous economic activities and their interrelationships. These include the use of renewable resources in farming and fishing, destruction and impairment of ecosystems and habitats through extraction of non-renewable

resources, and fragmentation of ecosystems due to infrastructure development, industrialisation and human settlement.

2.2 The challenge of setting environmental limits

The concept of environmental limits relates first and foremost to the undisputable biophysical limitations of the Earth in terms of the availability of natural resources and the absorption capacity of sinks. It cannot, however, be seen as a purely natural science concept. The natural sciences can supply instrumental knowledge through the description of factual relationships. They can, for example, identify causal relationships and causal chains, and under certain circumstances predict the probability of specific trends and events. Environmental limits, in contrast, describe thresholds beyond which undesirable events can be expected. What is deemed 'undesirable' cannot be determined purely on the basis of natural science. Given the scientific uncertainties, conclusions on environmental limits are always judgements concerning the degree of precaution that appears acceptable to society. **In a democratic society, the setting of environmental limits calls for broad societal and political acceptance based on long-term, informed self-interest.**

Systematically determining what is the 'maximum admissible exploitation of the environment', however, is non-trivial for various reasons. The concept of environmental limits (and related concepts such as 'environmental sustainability', 'planetary boundaries' and 'critical natural capital') relates to the basic understanding that human resource use must be kept within the regenerative capacity of the environment and that there are critical thresholds for key global ecosystems beyond which there is a risk of triggering abrupt and potentially catastrophic change. Quantification of such thresholds involves considerable uncertainty, however, for example because complex biophysical systems and regeneration processes that contribute to inherent stability are inadequately understood. This uncertainty generally means that the precautionary principle must be brought into play.

The last two decades have indeed seen the development of policy approaches, mostly in European directives, establishing quality targets for numerous environmental media together with action plans for target attainment. Examples include policy on climate change, clean air, surface waters and the marine environment, plus with certain restrictions soil conservation and nature conservation. **Many of the quality targets are in need of revision, however, in an ongoing, medium-term updating process. The system of targets is also strongly focused on local and regional environment problems and too little on 'planetary boundaries'.**

Environmental targets are based on scientific knowledge, for example about the storage capacity of sinks and the regenerating capacity of renewable resources. Nonetheless, they ultimately involve setting normative limits for socially acceptable risks, and such limit setting

cannot be left to science alone. At least implicitly, there will always be a trade-off between costs of target attainment and the anticipated benefits. The issue of competing international and intergenerational claims on natural resources likewise demands a political answer. A decisive factor in this process is scientific, technological and economic capacity for action that publicly highlights the need for environmental policy change and illustrates the options available at the various levels (such as choice of technology, structure of the economy and rate of growth). Target setting and capacity building can operate over decades in a mutually reinforcing process.

How self-reinforcing "policy feedback" can operate on the basis of robust global scientific consensus on environmental limit setting can be illustrated by the example of climate policy. The 2 °C target adopted internationally in 2010 at the United Nations Climate Change Conference in Cancún after some 15 years of debate is essentially based on increasingly robust scientific findings from the Intergovernmental Panel on Climate Change (IPCC), successful global communication of the economic effects of climate policy inaction by the Stern Review, and the illustration of those effects with great media impact by extreme events that can be attributed to climate change. At the same time, however, the capacity for ambitious climate policy had grown, not least because policymakers were presented with a range of potential problem-solving technologies and a promising climate policy toolkit. The associated commercial opportunities boosted industry acceptance of the 2 °C target and corresponding emission reduction targets. The reduction requirements now accepted both nationally and at European level provide the foundation for a broad-based energy and climate policy action programme.

Operationalising environmental targets is thus a long-term responsibility to be discharged on a coordinated basis at various levels of policy action. Despite the clearly demanding political and legal challenges, the development of strategies based on environmental targets should continue.

2.3 The need for a well-functioning science-policy interface

Policy action can only be aligned to the observance of environmental limits if there is broad social consensus on the environmental targets involved. The setting of environmental quality targets must take adequate account of knowledge regarding environmental limits; ultimately, however, environmental targets are essentially also social conventions. This is evident not least from the fact that many such targets are associated with implicitly and explicitly formulated notions of what can be considered fair allocation of global commons. Such generally applicable value judgements fall within the core domain of democratic policymaking. For this reason, environmental targets cannot be purely science-based, but are ultimately a product of democratic consensus building and decision making processes that must nonetheless be informed by science. Of key importance in this regards is a

systematic strengthening of the knowledge base in relation to biophysical limits and its integration into policymaking.

The structure and working practices of the Intergovernmental Panel on Climate Change (IPCC) serve as a model for successful institutionalisation of scientific policy consultation, because they link policymaking with science in a way that the integrity and autonomy of both systems are upheld. The IPCC is seen as one of the most influential international institutions for climate policy. Without its work, the long road to international consensus on the 2° Celsius target would have been more or less unthinkable. The IPCC's success is largely due to the policy integration of its work. This occurs through the summary for decision makers being mandated and adopted by member state representatives and also through the synchronisation of its activities with international climate change talks. The very broad-based participation of several hundred scientists also gives high-level authority to the research findings. All this is underpinned by sophisticated quality assurance processes and reviews of available knowledge.

This contrasts with the failure of a purely science-based institutionalised approach in the Global Biodiversity Assessment of 1995. The process attracted insufficient political support at government level because some states doubted the legitimacy of the panel and its findings. This influenced initiatives which, along similar lines to the IPCC, were designed to establish the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES). The use of natural resources is covered by the International Resource Panel. However, in terms of its resources and international policy integration, this is a relatively weakly institutionalised expert panel that remains an arm of the United Nations Environment Programme (UNEP) and deserves upgrading to give it similar status to the IPCC. Ideas have already been developed for an Intergovernmental Panel for Sustainable Resource Management.

As early as 2000, the German Advisory Council on Global Change (WBGU) recommended the establishment of an 'Earth Council' to provide timely warning of high-risk developments and to formulate environmental guard rails. Particularly with regard to the interactions between global systemic risks, at minimum close cooperation between various international research and government platforms is of great importance. These also largely depend for their success on financing and staffing and on the scope and the depth of available knowledge concerning planetary boundaries, tipping points and systemic risks. The German government should thus actively support capacity building for such platforms. This applies both for the necessary further expansion of basic research on endangered earth systems under the remit of the Federal German Ministry for Education and Research (BMBF), and for the creation and establishment of international scientific expert panels. The key role of 'epistemic' communities in which there is consensus on problem diagnosis and resolution is adequately supported by research in relation to international environmental conventions.

Science-based expert consensus in the international research community can secure a standard of environmental policy in environmental conventions that policy focused on economics and national interests would not be able to achieve.

Approaches for the identification of critical limits at the interface between policy and research are also in place at European level. The European Environment Agency's State of the Environment Report gives a worrying account of overexploitation and overstretching of specific resources. Yet it lacks the degree of integration into policy processes that would be necessary for policy consensus-based setting of quantitative limits. In other respects, integration of scientific and analysis is relatively well established in other areas. One example is fisheries, where in recent times the International Council for the Exploration of the Sea (ICES) has based its recommendations for determining catch quotas for specific fish stocks on the concept of maximum sustainable yield. The Clean Air for Europe (CAFE) Programme supplies the basis for EU clean air policy designed to minimise health risks and prevent critical levels from being exceeded. EU clean air policy in particular has served as an example of intensive and successful institutional integration of natural science and economic modelling and policymaking with the ability to formulate ambitious and robust quality targets and emission budgets for key air pollutants. It relies to a significant extent on findings from the World Health Organisation (WHO). Systematic processes for precautionary, science-based identification of environmental limits should also continue to be advanced with regard to other natural commons, resources and sinks (e.g. forests, soils, the oceans, fresh water, 'green infrastructure', sustainable land use and the nitrogen cycle). They should be coupled with high-ranking environmental policy processes and receive consideration at the highest policymaking level in programme development. There is still considerable need for institutional capacity building in this regard to promote the integration of research and policymaking at all levels of governance, to lay the groundwork for robust limits, budgets and guard rails and to integrate these into environmental policy goal formulation. In the process, increasing attention must be paid to coherence and interactions between individual sectors in order to anticipate and prevent any shifting of problems from one area to another. In many cases, the task at hand will be to make existing processes and research findings available at a high policymaking level and to translate them into politically communicable messages.

3 A strategic role for the 7th EAP

3.1 Policy strategies and their functions in relation to environmental limits

The SRU regards policy strategy processes as key points of departure for better aligning policy decisions so that environmental limits are not exceeded. The three types of strategy – sustainability strategies, environmental strategies, and sectoral strategies with environmental

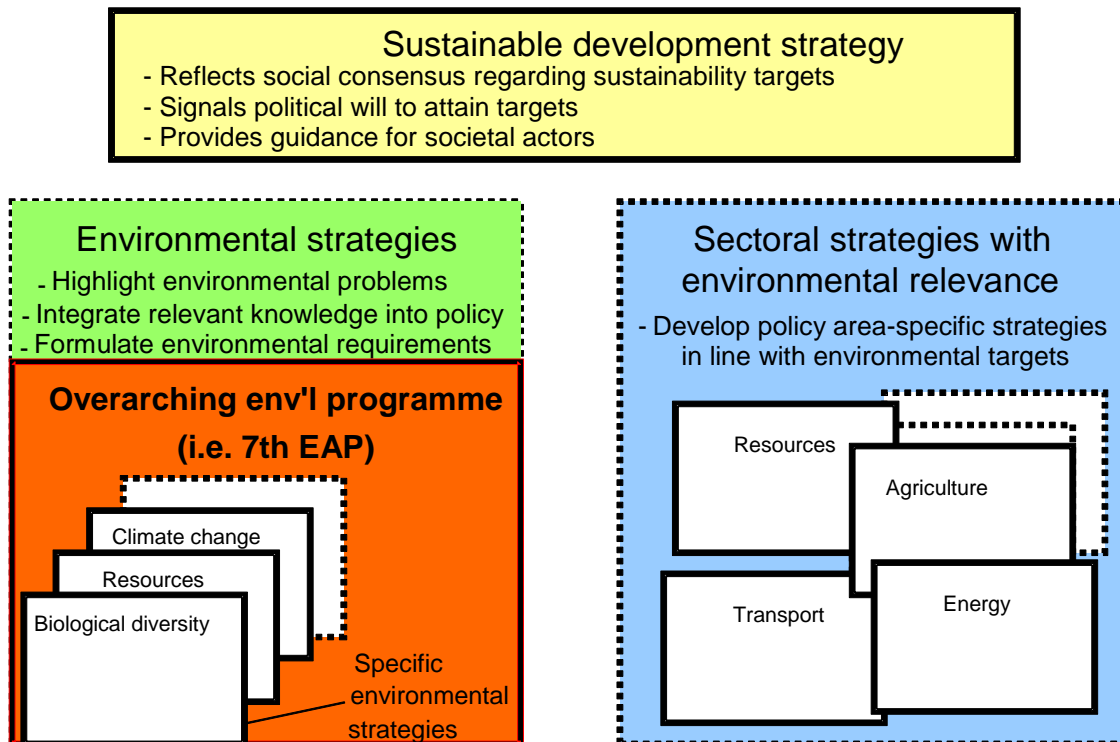
relevance – can contribute in a different, complementary and mutually reinforcing way towards environmental policy that is systematically geared to the observance of environmental limits. It is important, however, to have a realistic assessment of the possible contribution of the respective strategic approaches and of their interactions.

A key function of *sustainability strategies* is to generate broad social consensus on sustainability objectives. With regard to conservation of the natural foundations of life, it is essential that the target system in sustainability strategies should centre on long-term targets relating to the various elements of the environment. These should be complemented with short-term and medium-term environmental action targets. International and national climate targets are salient examples of how such targets can act as signals and provide guidance.

Environmental strategies - such as the 7th EAP - should establish a comprehensive set of environmental guard rails for the use of natural resources and sinks and be subject to a process of ongoing review. Targets should be formulated with regard not only to national variables, but preferably also global commons and their fair use. The targets should be set so as to avoid critical tipping points and thresholds while also taking into account technical and economic mitigation potential and its cost at various levels. This requires a broad and knowledge-intensive preparation process. This should be the most prominent task following the 7th EAP.

Other policy areas should incorporate relevant environmental targets when developing *sectoral strategies with environmental relevance* and should align their policies with the targets. Environmental targets provide the basis for an economy operating within sustainability limits, and hence for allocations and restrictions using market or command-and-control instruments and sectoral transformation strategies. They thus require a relatively long-term time horizon.

SRU proposal for an architecture for policy strategies and their functions relative to environmental limits



SRU/UG 2012/Fig. 11-1

3.2 Functions of Environment Action Programmes

EU's environment action programmes (EAPs) have a general guidance function by setting general objectives and broad lines of environmental policy. Whereas earlier environment action programmes were launched once every five years, the 5th and the current 6th EAP each run for ten years. Environment action programmes both past and present formulate the basic environmental policy approach for their respective period and provide an opportunity for an overall assessment. Even if there is a certain amount of scepticism as to their regulatory effectiveness, EAPs have significantly greater legitimacy than simple Commission communications. They are adopted in the regular legislative procedure by the European Parliament and the Council and can consequently help achieve broader identification with policy.

One of the most far-reaching European environment programmes is considered to be the 5th EAP of 1992, notably because it was developed on the model of the Netherlands National Environmental Policy Plan, in which environmental policy targets are formulated on the basis of environmental guard rails. The 5th EAP aimed to encourage the integration of environmental aspects in other sectors by formulating sectoral approaches. The 6th EAP of

2002 was far more low-key in terms of target-driven policy approach. A number of strategic goals were formulated as overarching principles (Article 2). Only some targets, however, were quantified and operationalised in the 6th EAP itself. This task was left, albeit with very varied success, for seven thematic strategies. As a result, the 6th EAP made only a limited contribution to the setting of environmental policy targets as such.

Despite this, subsequent to the evaluation of the 6th EAP, the Environment Council and the European Commission unanimously identified important tasks and functions for environment action programmes. **Of outstanding importance is the environmental policy guidance function of an EAP and the heightened legitimacy and political backup enjoyed by a programme jointly adopted by Council and Parliament.** An EAP can:

- provide overarching rationale for various environmental policy initiatives and strategies and thus help ensure cohesion between them
- facilitate the communication of and mediation between individual targets and measures, and
- propose instruments to operationalise higher-level objectives such as those formulated in the European Sustainable Development Strategy.

Overall, an EAP can thus make an important contribution towards policy visibility and so serve as a symbol for the high standing of European environmental policy. Not least, the absence of comparable environment strategies in many member states constitutes a key argument in favour of a 7th EAP as a general guiding framework. **For it to fulfil this function, however, a programme needs to be given a clear profile with an overarching approach and identifiable focus areas.**

The Council of Environment Ministers formulated programmatic requirements for a 7th EAP as early as December 2010:

- an ambitious vision for environmental policy to 2050 with priorities and realistic targets for 2020;
- improved coherence, complementarity and synergies with other EU strategies and better integration of the environmental dimension into other Community policies;
- consideration of the global environmental impacts of economic and policy action in the EU; and
- incentives for an absolute decoupling of economic growth and environmental degradation.

Practical implementation of these general principles and requirements raises the question of what programmatic value is gained relative to the many other environment-related strategies presented by the European Commission in recent times. The European Commission raised this problem in connection with the Roadmap to a Resource Efficient Europe, which applies a concept of resources that encompasses the entire environment and so pre-empts an EAP in

programmatic terms. The Roadmap includes a number of far-reaching and thematically broad-based visions for 2020 and 2050. The Commission mentions the goal of respecting environmental limits, for example. It aims to abolish environmentally harmful subsidies by 2020. A green tax reform is to be brought about in Member States by shifting taxation from labour to environmental impacts. This is to be effected in line with best practice in Member States. The net land take is to be reduced to zero by 2050. Far-reaching environmental targets are also formulated for waste, surface waters, air and biodiversity. The roadmap also picks out the three consumption sectors of greatest environmental relevance: food, buildings, and mobility. Overall, numerous environmental policy action areas are addressed under the general tenet that the environment is a central economic resource and efficiency is the key to a solution. With this in mind, the 7th EAP can offer programmatic added value if it is given a profile of its own.

3.3 The 7th EAP in relation to the EU SDS and Europe 2020

The strategy debate in the EU has been dominated since 2000 by two in part politically competing, in part complementary strategy processes: on the one hand the economic policy Lisbon Strategy and on the other the European Sustainable Development Strategy with its greater emphasis on environment and social policy goals. The indeterminate relationship between the two strategies, their insufficient adequacy to the problems and their lacking regulatory effectiveness along with the weakness of their links with national and international strategy processes have been criticised on repeated occasions.

In its Europe 2020 strategy for 'smart, sustainable and inclusive growth' of March 2010, the EU has presented a cross-cutting strategy document for the decade to 2020 that succeeds the economic policy Lisbon Strategy but in the European Commission's current view is also intended to replace the European Sustainable Development Strategy. As of the end of 2011, the European Council has likewise not yet set a date for a comprehensive review of the Sustainable Development Strategy, even though such a review was initially planned. Whether the Europe 2020 strategy is indeed of such a comprehensive nature that it can accommodate the environmental targets of a sustainability strategy or an environment action programme, however, is viewed with scepticism. There are also fundamental goal differences between a strategy that draws upon notions of green growth and ecological modernisation and an understanding of sustainability that at least in its original sense clearly incorporates environmental limits and hence more radical change in industrialised nations.

The broad thematic scope of the Europe 2020 strategy covers key policy areas from the Sustainable Development Strategy. The strategy is formulated in concrete terms in seven 'flagship' initiatives. 'Resource efficient Europe', the flagship initiative intended to advance European environmental policy, in turn includes numerous, in some cases exceptionally far-

reaching programmes for climate change policy through to 2050, for the reform of European agricultural and structural policy and for the conservation of biodiversity. The goal of resource efficiency is very broadly defined and takes in many major areas of environmental policy. Overall, the Europe 2020 strategy is expected to generate significantly greater impetus and innovation than the EU Sustainable Development Strategy. For one thing, it launches new, complex policy processes with far-reaching goals such as climate-neutral electricity supply. For another, the implementation process is managed on a far tighter and more hierarchical basis by the Secretariat-General of the European Commission.

In its environment-related sections, the Europe 2020 strategy can be seen as an example of a strategy geared towards the guiding vision of the green economy, thereby reflecting the problematic restrictions of focus that go with that concept. Ambitious targets are thus indeed to be found in the Roadmap for Moving to a Competitive Low Carbon Economy in 2050, the Roadmap to a Single European Transport Area White Paper and the renewed Biodiversity Strategy. However, these targets are not systematically backed up by a credible programme of action. These various EU environmental policy strategies also stand under a growth imperative that the European Council reiterated in its conclusions. Growth and competitiveness are unequivocally the central themes of the Europe 2020 strategy ('smart', 'sustainable' and 'inclusive' being merely secondary criteria). The European Council describes the strategy as 'a new European strategy for jobs and growth'. Even the Resource Efficient Europe flagship initiative, the sole environmental policy pillar in the Europe 2020 strategy, emphasises: 'In response to these changes, increasing resource efficiency will be key to securing growth and jobs for Europe'. The same primarily economic rationale applies for the EU Biodiversity Strategy. How the task of '*addressing trade-offs*' is to be discharged when economics and the environment fail to deliver a win-win situation is something the environment-related strategies developed under Europe 2020 leave unanswered. A separate formulation of environmental objectives such as that set out in the European Sustainable Development Strategy – 'Safeguard the earth's capacity to support life in all its diversity' and 'respect the limits of the planet's natural resources' – is no longer to be found in the Europe 2020 strategy.

In 2006, it was still possible to assume a duality between growth and sustainability objectives, with the sustainability strategy having the function of an overarching long-term framework. In Europe 2020 this pecking order is evidently reversed: Environmental targets must largely have an economic rationale. As overarching objectives and the framework of discourse allocate opportunities to exert influence, particularly in the EU, and symbolise collective identities, the change of reference model on the part of the European Commission must be viewed critically.

For these reasons, the need remains for a separate European Sustainable Development Strategy. The environmental guard rails to be laid down in the light of the responsibility

towards the future and global equity have, with a view to economic policies with a long-term perspective, priority over short-run growth targets and need their own separate target setting. The EU Sustainable Development Strategy must therefore continue to be updated as an overarching long-term strategy.

The European Sustainable Development Strategy is also important for effective multilevel governance. This constitutes the European link in the chain between the international Rio agenda and national and regional sustainability strategies. Associated with this is the establishment of institutions and networks such as the European Sustainable Development Network, the Sustainable Development Observatory of the European Economic and Social Committee, and the Network of European Environment and Sustainable Development Advisory Councils. Without a renewed European Sustainable Development Strategy, these institutions that have come into being under the framework of sustainability policy are under threat. The renewed EU Sustainable Development Strategy should also be linked into the system of environmental policy targets to be developed under the 7th Environment Action Programme, either by formulating the general rationale for such targets or by picking up on individual targets.

4 Key concepts for the 7th EAP

In the following section, the SRU will point towards five key concepts which - taken together - are able to provide a promising frame to address the environmental challenges and should therefore be at the core of the 7th EAP:

- strong sustainability
- ecosystem services
- the green economy
- decoupling economic development and the use of natural resources

4.1 Strong sustainability

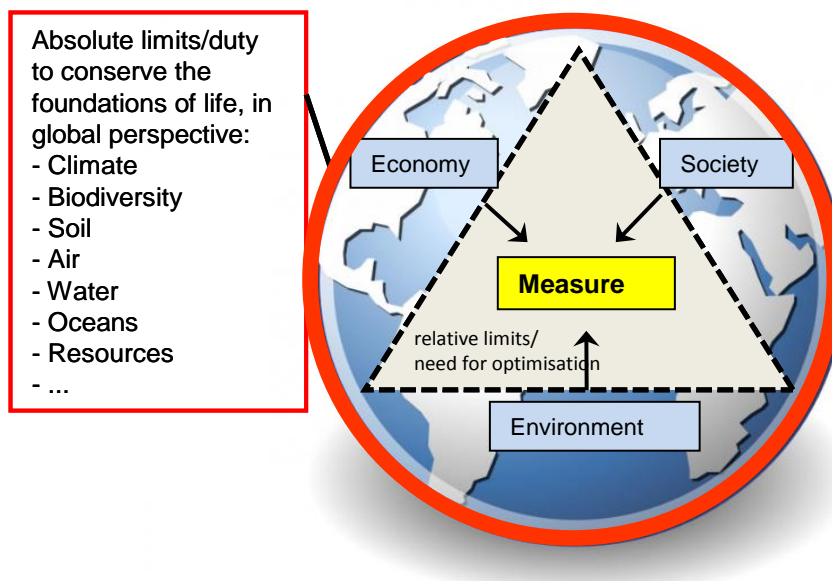
Recent publications such as the Millennium Ecosystem Assessment and the EEA's SOER refocus awareness on the frequently overlooked insight that the natural environment, and particularly the climate and biodiversity, are vital to human survival. **Stable social and economic systems would be unthinkable without functioning ecosystems and the conservation of natural capital.** In thermodynamic terms, the global environmental system is characterised by structural complexity and low entropy, meaning a high degree of order. By contrast, the economic system converts natural structures with low entropy into something else (by burning coal and oil, for example), thus increasing the entropy level. The economy, in its resource-related dimensions, relies on 'factors' it cannot itself produce but

can only consume. The economic system must therefore keep within the limits of nature's reproductive capacity. Sustainability means operating within the given environmental limits.

The conventional sustainability model, which gives essentially equal weight to economic, environmental and social objectives, does not adequately take account of the supraordinate character of the environment. In neoclassical economics in particular, there is a widely held notion that future generations must merely be left a constant overall stock of capital resources. This implies that it is acceptable to use natural capital and to transform it into material capital or knowledge as long as the overall stock of useful capital is undiminished. This notion of the substitutability of natural capital with other forms of capital is at the heart of the concept of *weak* sustainability.

In contrast, the 7th EAP should reflect the concept of *strong* sustainability, which is based on the assumption of limited possibilities for substituting natural capital with other forms of capital. The maintenance of environmental carrying capacity requires trade-offs between various sustainability goals **within a given set of environmental limits**.

Sustainability model with human activity embedded in a limited environment



Source: SRU 2011

In a 'full world' (Herman E. Daly), meaning a world in which people and man-made things have displaced nature to a significant extent, limits must therefore be set for the physical energy and material throughput. As Daly has shown, given the shrinking spare capacity of the natural environment, it is no longer a matter of the traditional tasks of efficient allocation and fair distribution of natural resources. Rather, the primary issue is managing the scale of resource use and pollution. An overloaded ship can be saved from sinking not by shifting its cargo, but most readily by reducing the cargo to an acceptable size.

Use of global resources also raises the issue of intra-generational and in particular global equity in distribution. **The 7th EAP should expressly endorse the principle of fair and equal per capita rights to natural resources.** The objective must therefore be to reduce the use of environmental resources in Europe to a level that could be maintained on a global scale.

The SRU believes that Europe should meet its global responsibility in this way even if other countries fail to follow suit. Firstly, pioneers are needed both to convince other industrialised nations and emerging economies that sustainable strategies are feasible and to gain the trust of developing countries. Secondly, such pioneers can themselves benefit by becoming technology leaders and being better equipped than other countries to meet new requirements and market conditions. At the same time, relevant targets and measures must be adopted at European and international level to enable the fastest possible and greatest possible improvement to the environmental situation.

4.2 Ecosystem services

Ecosystem services are defined as the benefits people obtain from ecosystems or more simply as ecological processes that are important to human wellbeing and therefore of value. The definition of ecosystem services used both in the Millennium Ecosystem Assessment and the Economics of Ecosystems and Biodiversity Study (TEEB Study) also includes resources like timber and food, and thus covers material, energy and non-material aspects. The TEEB Study distinguishes between direct contributions (e.g. consumption of food and enjoyment of beautiful scenery) and indirect contributions (e.g. purification of drinking water by soil filtration).

The aim of the concept of ecosystem services is to make human dependence on the environment more transparent and to show the value of nature to human life and the economy. Supporting services, such as the nutrient cycle and soil formation, and many regulating services like pollination and the control of pests and soil erosion have long been taken for granted by a society that has used them free of charge and failed to adequately protect them.

Problems arise, however, when individual ecosystem services are viewed in isolation, independent of their role in an environmental context. In some cases this has resulted in courses of action being taken on the grounds that they promote or provide certain ecosystem services although they simultaneously leads to biodiversity loss. Unthinking use of the ecosystem services concept can thus stand in the way of nature conservation and environment protection. For this reason, in connection with the Convention on Biological Diversity (CBD), reference is always made to the conservation of biodiversity *and* ecosystem services (e.g. in the Strategic Plan 2001-2020). The new EU Biodiversity Strategy for 2020 also uses the two terms in combination.

Consideration must also be given to the fact that economic analysis of ecosystem services reaches its limits where ecosystems become highly complex, where there are uncertainties regarding interactions, and where tipping points beyond which systems are unstable become hard to predict. In these cases, monetary analysis becomes particularly unreliable for scientific purposes. Economic analysis methodologies are also far more difficult to apply to some environmental goods than to others. Additionally, the outcomes of economic analysis always depend on necessarily subjective methodological choices made by study authors. Such choices vary, however, depending on the type of good being evaluated, the methodologies used and the analysis timeframe. In practice, economic analysis of ecosystems harbours the risk of narrowing or distorting perceptions of various environmental aspects.

The 7th EAP should draw on the concept of ecosystem services but treat them as integral part of nature conservation and environment protection to ensure that both sub-goals are achieved.

4.3 The green economy

The concept of the green economy has become established at global level as a new guiding vision in environmental policy. The 'green economy', 'green growth' or 'sustainable growth' discourse also plays an increasingly important part in strategy processes at national and European level. **The green economy concept both presents new opportunities for environmental policy, especially with regard to incorporating environmental limits, and poses risks, which also should be addressed in the 7 EAP.**

The career of the green economy model follows on from a long-term tendency in the environmental policy discourse to incorporate elements of economic analysis. Increasing importance is thus attached to a frame of argument under which the various facets of environmental policy are centrally analysed in economic categories (cost, benefit, capital, market, efficiency, productivity, etc.), from which need for action is identified and potential solutions are derived. Analysis of environmental problems from an economic perspective is not new and in fact has a long academic and political tradition. What is remarkable about recent developments, however, is the dominance that the economic discourse has now attained.

The common core tenet of the current green economy discourse is that environment protection should not be generally seen as a cost factor and instead presents major economic opportunities. Beyond this central tenet, however, national and international debate on the subject varies considerably – not just with regard to the key terms used, but also with regard to choice of focus, rationale and conclusions drawn. The green economy concept as used by the United Nations Environment Programme (UNEP), for example, is based on an analysis not only of economic and environmental crises, but also of their social

causes and effects. Emphasis is placed among other things on the great importance of stable ecosystems for the alleviation of poverty, not least in view of the dependence of rural populations in developing countries on local environmental conditions. The OECD's analysis, on the other hand, is rooted in a tradition of promoting efficient, market-friendly economic policies, which it supplements by taking into account environmental limits. It consequently centres on the goal of permanently sustaining global economic growth despite finite resources and ecosystems under pressure. Economic growth thus remains the main measure of economic success, although the need is noted for a 'broader concept of progress'.

Despite the highly varied nature of the analysis, the green economy concept is generally associated with three recurring and related lines of argument:

- *The environment as an economic resource:* This discourse is based on the root tenet of environmental economics that overexploitation of natural resources and sinks should essentially be treated as a problem of market failure. Because environmental goods are often public goods whose non-exclusivity means they are not market-traded, scarcities do not feed through into the price and overexploitation results. To better measure the economic cost of resource overexploitation, numerous analyses and studies have been compiled in recent years that highlight the dependence of human society and economic activities on nature. Many such studies also attempted to put an economic value on ecosystem services. The studies also show, in line with the insights of environmental economics, that there is very little or no scope for substituting many services associated with natural capital with other forms of capital.
- *The economic opportunities of environment protection:* In contrast to the traditional discourse, in which environment protection was treated as a cost factor, here it is emphasised that in many ways environmental policy can have positive economic effects. This relates not only to direct savings for industry, but also to the launch of modernisation processes with positive results for the economy, secondary benefits in other sectors and, not least, international competitive advantages in growing future 'green' markets for environmental technologies.
- *Market-based environmental policy:* The core of this line of argument is the rationale for market-based environmental policy. To conserve the environment as an economic resource and maximise economic opportunities, environmental policy should be designed to correct the identified market failure by internalising external costs. To this end, environmental policy instruments should be made business-friendly and innovation-friendly to attain environmental targets at minimum cost.

In the SRU's opinion, the 7th EAP should draw on the green economy concept because it is a valuable frame for policy strategies to keep within environmental limits:

It is positive that the green economy concept brings out the economic importance of

functioning ecosystems. Even if loss of ecosystem function is only viewed selectively from an economic perspective, this is an important precondition for the development of strategies that are adequate to the problem and incorporate environmental limits. The green economy discourse enhances the economic legitimacy of environmental policy and can thus be a strong driver of measures and instruments with a clearly positive cost-benefits relationship. It also improves the acceptance of instruments that can help internalise external costs and hence serve what is considered a fundamentally legitimate goal of correcting market failure.

On the other hand, the use of the concept in the 7th EAP should also bear in mind that the green economy discourse can restrict the analysis in unacceptable ways. First of all, it restricts the legitimisation of environment protection to economic benefit. This is questionable not only on ethical and legal grounds; most of all, it raises problems in the face of limited knowledge, uncertainty and methodological difficulties. In practice, it can be seen that incorporating economics into the environmental policy discourse poses a challenge for environmental administrations, which come under greater pressure to justify any action where the costs are known but the benefits are uncertain or methodologically impossible to determine. This creates a systematic bias to the detriment of environmental goods and issues whose operation is more complex and about which knowledge is less advanced. In particular, it is important when making trade-offs to prevent environmental aspects that can be monetised with greater reliability and less effort from being given greater weight than those which are economically hard to capture. There is also a danger of economic analysis at a specific geographical level failing to take into account potential impacts at other levels, resulting in the neglect of displacement and shifting effects. Even greater problems are raised, however, when the line of argument based on the economic opportunities of environment protection becomes the sole policy driver – a rationale echoed, for example, in the Europe 2020 growth strategy. The danger here is of environmental policy forfeiting its independent rationale and hence losing policy influence.

4.4 Decoupling economic development and the use of natural resources

The decoupling agenda should be at the heart of the 7th EAP. In order to attain a sustainable development path within environmental limits, full use must be made of the potential for decoupling growth from the exploitation of resources and the environment. The greater the reduction in energy and material throughput in industry, the less urgent the need to address the issue of growth. To achieve absolute decoupling, two approaches are necessary. Firstly, the infrastructure of industrial society must undergo fundamental change. This infrastructure includes the entire energy supply system, including generation and transmission, all transport infrastructure and, in a broader sense, agricultural supply structures. This must lead to biogenic resources being managed sustainably. In addition,

where technological solutions reach their limits, changed consumption patterns and behaviour can also play a key role in decoupling (e.g. in food consumption and mobility).

Various future scenarios show that the potential for technological innovation and improved efficiency has yet to be fully exploited, but in many areas new technological solutions must go hand in hand with social innovation. In the following it is argued that the free market alone cannot utilise this potential. The state must thus introduce regulation, but in doing so, it should be careful not to undermine the innovative powers of private enterprise.

The SRU used the example of a switch to a 100 percent renewables-generated electricity supply to show how a key sector can aid the achievement of climate change targets based on available knowledge of environmental limits. A climate-neutral electricity supply based on renewable energy sources can be made feasible not just for Germany, but for the rest of Europe and for North Africa, and also globally. With judicious choice of locations, renewables-based energy production and the successful use of potential for energy savings can prevent the shifting of problems to the detriment of nature conservation and protection of the countryside.

While the project for a sustainable energy basis for industry is already taking shape, the same cannot be said for the conservation of other natural resources, particularly biodiversity. This will depend on the transformation agenda being supplemented to take in other elements of the environment, not least to prevent problem-shifting strategies that pursue climate change objectives at the cost of natural resources.

Capacity to innovate in a free market economy is largely to be found in the private sector, making this the key actor that must be mobilised in order to embark on paths towards more sustainable development. There is, however, the possibility that technological innovation is more part of the problem than of the solution. Businesses must pursue ongoing innovation to remain competitive. The task now is to channel this innovativeness to areas where it either has no negative impact on the environment or offers solutions to the challenges of a sustainable economy.

Radical innovation and broader technological breakthroughs often come in response to economically or politically triggered scarcities. Although frequently not seen as such by the sectors it targets, regulation that provides an operating framework for private enterprise can serve as a driver of innovation. This can open up economic opportunities. In many sectors, green investment (in renewable energy sources, building modernisation, infrastructure and networks) will have to increase to such an extent that – at least in the interim – further growth in GDP can be generated without harming the environment.

So that these opportunities can be exploited, active structural policy must be implemented to underpin more sustainable technology paths. An enabling state is justified most of all on account of the innovation barriers inherent in the market. A particular challenge stems from

the lag between supply and demand for technological solutions. The reason is a certain path dependency with innovations that lead to steady, incremental improvement but not to fundamental new developments. Such path dependencies are also one of the reasons why the OECD warns against low overall economic returns and low appropriability of returns from green investment. Far-reaching institutional change must be initiated, both top-down by means of state-provided policy frameworks and bottom-up by means of learning processes.

The 'ensuring state' (A. Giddens) is defined for the most part as the state having ultimate responsibility for respecting environmental objectives based on environmental limits, for monitoring them and for the development of target-driven processes that lead to their institutionalisation. Within the stipulated guard rails, the rules of the free market apply, meaning that there is no deliberate allocation of scarce resources. The aim is to foster large-scale private investment, in part against prevailing market trends, to stimulate the transformation of production processes and infrastructures. But at the same time, regulation should not lead to further uncertainties. Rather it must determine the long-term environmental limits within which the economy is free to develop.

The German Advisory Council on the Environment

The Advisory Council on the Environment (SRU) was founded in 1971 to advise on German and European environmental policy. The Council is made up of seven university professors from a range of different environment-related disciplines. This ensures an encompassing and independent evaluation from a natural scientific and technical as well as from an economic, legal, and political science perspective. The Council is a member of the network of European Environmental and Sustainable Development Advisory Councils (EEAC). It has currently the following members:

- *Prof. Dr. Martin Faulstich (Vorsitzender), Technische Universität München*
- *Prof. Dr. Heidi Foth (stellv. Vorsitzende), Universität Halle-Wittenberg*
- *Prof. Dr. Christian Calliess, Freie Universität Berlin*
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- *Prof. Dr. Miranda Schreurs, Freie Universität Berlin*

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