

Annexes to the Training manual

Annex 1 Case study. SEA of Regional Development Operational Programme 2007-2013 Romania¹.

1. Background

The planning process of operational programmes in Romania started in 2005, after the Romanian National Strategic Reference Framework (NSRF) was finalized. The Regional Operational Programme of Romania for the years 2007-2013 (ROP) was elaborated by the Ministry of European Integration of Romania (the Managing Authority). It adheres to thematic priority identified in the National Strategic Reference Framework aimed at “promoting balanced territorial development”. The ROP determines objectives, priority axes and key areas of intervention within which it will be possible to submit project applications for co-financing from the EU Cohesion Fund. The ROP has a standard structure with core elements: analysis of the current situation; SWOT (strengths, weaknesses, opportunities and threats) analysis; strategy; financial plan and implementation (which included evaluation and monitoring).

The SEA of OPs in Romania were carried out as a part of “Ex-ante evaluation” project, which is a process in itself aimed at providing judgement and recommendations by independent experts, and improving and strengthening the final quality of the strategic document under preparation. The experts who worked on ex-ante evaluation focused on the economic and social justification of the OPs, their coherence, effectiveness and administrative as well as financial feasibility, while SEA was concentrated exclusively on environmental issues. This provides for the conclusion that integrated sustainability appraisal was enabled neither by the methodology used, nor by the coordination of activities of ex-ante and SEA expert teams.

The “Ex-ante evaluation” project including SEA (as a part of it) officially lasted till mid 2007, however due to the deadline to submit the official OPs with relevant SEA documents to the EC for approval in early 2007, the available timeline for SEA ended in January 2007 with submission of the final environmental reports to the environmental authority for approval. The process of assessment including obligatory consultation phase of 45 calendar days lasted 5.5 months in total. Time available for assessment before the public consultation process was 3.5 months.

The analysis for the elaboration of the ROP identified that a process which started after 1990 caused the increasing economic and social disparities among regions of Romania so that the gap between the most developed region (Bucharest-Ilfov) and the less developed region (North-East), in terms of GDP/inhabitant, became almost three times. At the same time, increasing disparities between the regions located in the Western half of the country (North-West, Centre, West) better developed and the Eastern part of the

¹ This case draws on two main documents: the SEA report for the Regional Operational Programme 2007-2013 prepared by REC for CEE and its Romanian Country Office (online at <http://www.recromania.ro/>) and a conference paper by Ausra Jurkeviciute - SEA of Structural funds' operational programmes for 2007-2013 in Romania for the Easy-Eco Conference in Vienna, March, 2008. Additional comments and clarifications were given by Mrs. Jurkeviciute in personal communication.

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country (North-East, South-East, South and South-West), less developed were observed. Implementation of the ROP was to support the regions lagging behind by stimulating the use of region-specific resources not fully exploited before in order to accelerate the economic growth of less developed regions.

ROP was aiming at measures to be implemented by regional authorities and authorities established for the purpose of implementation of the measures planned within the ROP. Though it was decided to have a separate OP for the regional development, there were a number of activities which could otherwise easily be done within the scope of the Environmental OP (such as waste and water management) or transport OP (regional road infrastructure).

2. Timeline

1. Drafting of the ROP

The Managing Authorities started drafting all OPs in 2005 with first drafts of documents appearing in later 2005 and early 2006. Though it was not until August 2006, when consultants received official drafts of OPs to be assessed and could start working.

2. Scoping meeting of the SEA - September 2006

The content and scope of the assessment was determined during the scoping meeting with the Working Group established for the purpose of SEA by the Managing Authority. Consultations with authorities on scoping issues was called scoping meeting, but it did not mean that the SEA team went there unprepared. It prepared the framework for SEA/scope and discussed it on the meeting.

3. The assessment process – September 2006-January 2007.

From the time of the start of the project, a working version of ROP from **April 2006** was made available to the SEA team and the process then continued parallelly with the amendments introduced to the ROP by the Managing Authority due to further elaboration, consultations with stakeholders and ex-ante evaluation recommendations.

In **November** the Managing Authority provided with the second draft version of the report, which had some modifications. The environmental report reflected this latest draft of the ROP. The April version was the main object of assessment and then the SEA experts looked what changes have been introduced in November, so in a way they did a double check of the wording of the objectives, key areas of intervention and some other items, but there were not so many changes in the new version. It was completed on **16th of November**.

Consultations - November 2006 – January 2007

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The ROP and the draft environmental report were made available for public consultations at the end of **November 2006**. The open consultations with other relevant stakeholders and the public lasted 45 days as required by the national law. The Final Public Debate was held on **18 January 2007**.

4. Final version of the environmental report – January 2007

Based on the request of the Ministry of Finance, that wished to ensure that SEA considers alternatives options, another draft/version of the ROP was provided to the SEA team on 19th of January 2007. The task of the SEA team was over with consultations. They provided the summary of the comments of the public to the Ministry of Finance and the Regional Development Ministry. The Ministry of the Environment had to issue the statement regarding integration of the comments of the public into the programme.

3. What did the SEA team do?

According to the SEA directive SEA means “the preparation of an environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision in accordance with Articles 4 to 9.”(Art.2(b)). In that case the distribution of the responsibilities was:

- the preparation of the environmental report was contracted to an international consortium of companies;
- SEA consultations were conducted by the consortium in cooperation with the national managing authorities
- taking into account of the environmental report and consultation results was done by the managing authority and
- the national environmental authority issued the decision on the acceptance of the environmental report and informed the public, how the environmental report and the consultation results have been taken into account.

4. Methodology

Scope of the study

The reference framework for conducting SEA was the set of relevant environmental objectives endorsed during the Scoping meeting referred above. The objectives were identified after analysis of existing relevant national and international strategic documents (strategies, plans and programmes) and current status of environmental issues related to the environment and focus of the ROP. The final set of relevant environmental objectives also included relevant human health issues and specific issues related to environment and biodiversity protection (within the framework of Natura 2000).

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The “Handbook on SEA for Cohesion Policy 2007 - 2013” (GRDP, 2006) provided information, resources and procedural guidance to carry out SEA for Cohesion Policy programming documents. The Handbook recommended the core seven steps of the SEA Process.

Step 1: Determination of the right focus of the SEA (scoping)

The step included establishment and setting of

- key environmental issues for the programming document, based on the issues the OPs have been dealing with and based on the targets set for the Government to attain to
- relevant environmental objectives for each environmental issue established
- focused questions or indicators to guide the assessment.

This step established the basic assurance of the programming team and environmental authorities that SEA will focus on key issues through the assessment.

Step 2: Assessment of the environmental context

The step included formulation of:

- past trends for each guiding question or indicator;
- future evolution of these trends if the programming document is not implemented (i.e. considering the OPs in preparation and any other relevant future developments);

This step can be done within analysis of the development context – examining future threats/constraints and opportunities from environmental perspective. In case of the assessment in Romania the trends have been described after the background situation has been established and main issues or guiding question have been pointed out.

Step 3: Assessment of development objectives and priorities of the programming document

The first assessment step enabled to establish the key conflicts and synergies with relevant environmental issues and objectives. As an output of the step, recommendations for adjustments of proposed orientation of the programming document and suggestions for development of eligible measures/actions were elaborated.

Step 4: Assessment of proposed measures/activities

The step includes formulation of:

- positive and negative effects of relevant environmental issues and objectives
- nature of impacts explained (direct, indirect, duration, reversibility, transboundary nature, etc.)

The important outputs of the set are recommendations for adjustments of measures/activities and suggestions of selection criteria or preliminary ToRs for EIA of specific activities.

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The activities in the ROP were planned within the Priority axes and were called Key Areas of Intervention (KAIs). Assessment results have been summarized for each KAI and reformulation, if any have been provided at the end of the assessment tables.

Step 5: Assessment of cumulative impacts of the entire programming document

The step includes formulation of cumulative impacts of all measures on specific environmental issue or objective and considers the expected future baseline trends in each issue as set during the Step 2. The output of the step was the concluding suggestions for mitigation and enhancement measures. The assessments for each individual KAI has been summarized and sorted based on the effects on the relevant environmental objectives. Both positive and negative cumulative effects were summarised, but only significant ones have been highlighted and mitigation measure proposed.

Step 6: Assessment of proposed management system for implementation

The step includes formulation of environmental selection criteria, environmental scoring sheets (preliminary or formal) for activities that will seek funding and roles of environmental authorities during implementation of the programming document.

Environmental evaluation of project applications was proposed in two stages: - 1)Pre-project environmental evaluation during project preparation, and 2)formal environmental evaluation within official selection procedures.

As a first stage, the project applicants (submitting entities) were enabled to undertake environmental evaluation during elaboration of their project application. This had to enable them to modify the project so as it gets the best possible evaluation as for its environmental impacts.

The formal environmental evaluation of project applications should be carried out as an integral part of the selection procedures concerning granting of support. Environmental evaluation forms have to be submitted by the project applicant with the project application and reviewed - in the framework of the overall evaluation by environmental specialists at the Evaluation Committee (ideally representative of the environmental authority). This review will analyse the quality of submitted environmental evaluation and can propose changes in the project and/or conditions for the project implementation. Based on this review, the selection committee will determine, inter alia, obligatory conditions for granting funds.

Step 7: Assessment of proposed monitoring system

The step includes the assessment whether it focuses on key environmental issues, is realistic and is easy to use and the data from environmental scoring sheets and/or formal monitoring could be used.

The environmental monitoring should measure the actual impact of the programming document on the relevant environmental issues and objectives. A list of indicators has been provided for each relevant environmental objective. The environmental indicators were to be integrated into the overall monitoring system of the implementation.

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5. Consultations

The environmental report was prepared in consultations with the Managing Authority. Consultation with other relevant authorities (ministries and agencies) has been done through the **Working Group** (WG) established for the purpose of the SEA. The purpose of the WG was to oversee the quality of the SEA and to provide input into the environmental assessment process. There were 2 workshops organized with the WG during the SEA: scoping meeting and the consultation meeting. The authorities invited in the WG were determined together with the Ministry of Environment and Water Management. There were presented only academia (health) and governmental authorities. The SEA team initiated a webpage within the Managing Authority where the SEA working documents and other relevant information was posted (www.mie.ro). Visitors to the web-site were able to comment on the draft SEA documents in writing and register to take part in the public debate which took place in January 2007.

REC Romania created an “Ex-ante Evaluation” web-page on its website (www.recromania.ro), which contains the documents produced during the SEA of ROP. The public debate was organized after the formal submission of the ROP including this environmental report to the SEA Authority (the Ministry of Environment and Water Management) and the open consultation phase of 45 days with other relevant stakeholders and the public as required by the national law. The comments and suggestions raised during this consultation phase and the public debate were considered within the final version of the environmental report and the ROP. The SEA team had to reply to every comment in a table and of course in the format of comments to put it into the environmental report.
(REC for CEE Romania CO.2007)

6. Outputs

SEA team used a set of relevant environmental objectives for assessment of the ROP sections and proposes to emphasize the link with sustainable development objectives identified in the EU Sustainable Development Strategy (Gothenburg 2001 and as renewed in Brussels 2006) and Sustainable Development Strategy of Romania (1999). Further it proposes to strengthen the references made to the need to support public transport as one of the preconditions for sustainable transport development. The SEA team proposes to amend the ROP with potential impact of tourism on the natural and cultural heritage and to refer to the actions being taken by the country to ensure sustainable tourism development; to strengthen and expand the environmental situation analysis in general and as relates to each region being supported under ROP; to supplement the SWOT analysis with environmental issues; to complement and modify the global and specific objectives in order to advance sustainable development; to modify formulation of some of the key areas of intervention in order to strengthen the potential progress towards sustainable development of the actions envisioned.

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During the assessment it was determined that the implementation of the objectives and priority axes of the ROP will have some significant environmental effects on the environment. Some significant negative effects may likely take place under priority axis 1 and 3.

The report recommended the following modifications of the Key Areas of Intervention (KAI) marked in red:

KAI 3.1: Development of **sustainable** business support structures

KAI 3.2: Industrial sites rehabilitation **and renovation of public utility infrastructure in urban areas**

KAI 5.2: Development of **sustainable** business environment

For the other 11 KAI no modifications were proposed.

Another important output of the assessment was the proposal for monitoring of environmental effects of the ROP implementation and a proposal for environmental selection system that will help to evaluate environmental performance of projects proposed for funding within ROP. The monitoring of environmental effects of the programme could be conducted with a set of environmental indicators were proposed (coordinated with the national environmental monitoring indicators as well as EEA indicators sets). Integration of environmental criteria and monitoring indicators into the overall implementation and monitoring system of the ROP will enable to focus the support from the EU funds on those activities.

In addition it was proposed to connect the monitoring system to the system of evaluating and selecting the projects, using environmental criteria and that the results of monitoring regularly (at least once a year) should be published. The monitoring should be ensured by sufficient personnel and professional capacities for environmental areas within and by involvement of the Ministry of Environment and Water Management into the discussion about the overall system of monitoring and especially the way of incorporating environmental issues into the overall system before it is launched.

Key mitigation measures recommended for implementation of ROP are that the projects have to be screened for EIA and if EIAs are carried out, special focus should be given the mitigation of any negative impact on Natura 2000, landscape fragmentation and green-field developments. All tourism development projects should undergo the EIA in order to enable alternative solutions to any environmentally harmful impacts (e.g. under “Carpathian Super-ski” development). It is recommended to enable environmental integration into operations supported by ROP to integrate the environmental selection system (criteria) into the overall project selection system as well as environmental monitoring indicators proposed in the report.

A system for environmental evaluation and selection of project applications is proposed as additional measure to prevent, reduce and as fully as possible offset any significant adverse effects on the environment (See the table below).

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During project selection it was recommended to give priority to developments that promote and enable Best Available Technologies (BAT) and investments to brownfields versus greenfields; that promote minimize and reduce energy efficiency and energy demand and reuse of waste. The projects should directly address the public transport but also in other measures under the ROP and aim at production and replacement of fossil based fuel with bio-fuel, to promote energy efficiency, environmental services in tourism sector but also such tourism activities as eco- tourism, agro- tourism, etc.; to have “greening” approach to the landscape and eco-systems, such as rehabilitation of the brownfields or afforestation and development of green areas/zones.

7. Difficulties:

The “classical” difficulties faced in the process were the late start of the assessment, the lack of time and inadequate public involvement.

All Operational Programs (OP) for Structural Funds were largely based on the objectives approved within National Strategic Reference Framework (NSRF) which is not a subject to the SEA procedure. This constituted an obstacle to SEA process since recommendations and suggestions to improve objectives of OPs from the environmental (sustainability) point of view were mostly rejected, arguing that those objectives have been approved already within NRSF and therefore could not have been changed.

Project title:

Impacts of the project on relevant env. objectives for the ROP

Relevant env. objectives for the ROP

1	0	-1	Short explanation of scale and nature of the effect
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Maintain and improve the quality of ambient air within the limits set by the legal norms

Minimize the impacts on the air quality at rural and urban level

Limit water pollution from point and diffuse pollution sources

Limit point and diffused pollution of soil and facilitate soil protection from water and wind erosion

Decrease emissions causing climate change

Protect and improve the conditions and functions of terrestrial and aquatic ecosystems against anthropogenic degradation, habitat fragmentation and deforestation

Preserve the natural diversity of fauna, flora, and habitats in protected

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areas and potential Natura 2000 sites

Facilitate improvement of human health by implementing measures aimed at pollution prevention and mitigation of old burdens (e.g. pesticides, brownfields, mining waste, etc.)

Protect and improve the condition of settlements with respect to transport noxes, particularly noise and vibration

Increase population protection from risks associated with natural disasters and industrial accidents

Limit use of depleting natural resources

Reduce waste generation, increase waste recovery, and facilitate recycling of all waste

Ensure protection of natural and cultural landscape by revitalization of brownfields and protection of natural habitats from fragmentation due to traffic corridors

Preserve, protect and rehabilitate the Romanian coastal zone of the Black Sea ensuring protection of natural (including terrestrial and aquatic ecosystems) and cultural heritage in order to achieve the sustainable development of the region

Improve energy efficiency and use of energy resources

Facilitate energy generation from renewable Resources

Improve environmentally-responsible behaviour of the public by involving the public into the solution of environmental issues

Support of environmentally friendly transport and promote development and usage of public transport

Promote tourism that would ensure high degree of environment

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Annex 2. Minimum content of the SEA report (SEA Directive, Annex 1)

- (a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;
- (b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;
- (c) the environmental characteristics of areas likely to be significantly affected;
- (d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;
- (e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;
- (f) the likely significant effects⁽¹⁾ on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;
- (g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;
- (h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;
- (i) a description of the measures envisaged concerning monitoring in accordance with Article 10;
- (j) a non-technical summary of the information provided under the above headings.

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Annex 3 CHECKLIST: ASSESSING DEVELOPMENT PLANS FOR APPROPRIATE ASSESSMENT

Screening Phase (combined with SEA)

Step 1 Identify the geographical scope of the plan.

Step 2 Identify all European sites that may be affected. This may require consideration of sites outside the boundaries of the plan area and should include both maritime and terrestrial sites. If there is any doubt as to whether any European site may be affected, a precautionary approach should be adopted and the site should be included in the assessment. SNH can advise.

Step 3 Consider the qualifying interests and conservation objectives of each European site which may be affected, in the context of the plan's aims and objectives. Remember that the area affected may extend beyond the boundaries of the plan area. SNH can advise.

Step 4 Consider the intentions of the aims, objectives, proposals and policies within the plan, and the anticipated changes to the interests of any of the sites that its implementation may cause or contribute to. Estimate the likely magnitude, duration, location and extent of the effects of these changes as far as they may reasonably be predicted at this stage. Remember that the area affected may extend beyond the boundaries of the plan area.

Step 5 Determine which, if any, elements of the plan would be likely to have a significant effect on any interest/feature of any European site, alone or in combination with other projects and plans, directly or indirectly. The European site or sites that could be affected, should be explicitly cited in the tests. This appraisal can be applied as a signposted or ring-fenced part of the normal SEA process or in a separate procedure.

Step 6 If the planning authority determines that the plan will not be likely to have a significant effect on any European site it may proceed to adoption or, in the case of structure plans, to submission for Scottish Ministers' approval without requirement for appropriate assessment. A record should be kept of the appraisal and the reasoning behind this conclusion, ensuring that the terminology of the Habitats Directive is used.

Step 7 For each likely significant effect, consider (in consultation with SNH and any other relevant body as appropriate) whether any option or alternative approach in the plan, including those that may have previously been rejected, could avoid such an effect on the international site, and still achieve the plan's aims and objectives. If such modifications remove the likelihood of a significant effect on any European site, the plan may proceed to adoption or submission for Scottish Ministers' approval. A record should be kept of the modifications made, their appraisal and the reasoning behind such a conclusion.

Appropriate Assessment Phase (specific to AA)

Step 8: Where a significant effect on a European site remains likely, an appropriate assessment is required. Agree the methods and scope of the appropriate assessment with SNH and other relevant stakeholders (eg SEPA; FCS).

Step 9: For each likely significant effect, alone or in combination, undertake an appropriate assessment of the implications for the site in light of its conservation objectives, using the best information, science and technical know-how available (regulation 48(1)). The Planning authority

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should acquire any further information, reasonably obtainable at this stage, to inform the assessment (regulation 48(2)). The assessment should be as full as practicable, being proportional to the level in the hierarchy and detail of the plan.

Step 10 Having formally consulted SNH (regulation 48(3)) and other stakeholders that may have information or expertise to assist the appropriate assessment (regulation 48(4)), the Planning Authority should identify any impacts on European sites, actions which might avoid or mitigate these, or restrictions which would allow them to be undertaken. The Planning Authority should ascertain that the plan would not adversely affect the integrity of any international site (regulation 48(5)). In doing so it should have regard to the manner in which it is proposed it will be carried out, and consider any restrictions or modifications to which the plan may be subjected, in order to achieve this (regulation 48(6)).

Step 11 If it *can* be ascertained that the plan will not adversely affect the integrity of any European site either with or without any restrictions or modifications which address any of the potential effects identified, it may proceed to adoption. In approving a higher level plan which will be subject to further elaboration at a more detailed level, it is important that conditions or restrictions on approval of the higher level plan ensure that further assessment will be required to ascertain that the integrity of any European site will not be adversely affected. It should be made explicit in the plan that any subsequent plan or project will only be compliant with the earlier plan in such circumstances.

Step 12 If it cannot be ascertained that a plan will not adversely affect the integrity of a European site, the planning authority can only proceed with it if it is agreed that it meets the necessary tests for imperative reasons of overriding public interest, there being no alternatives and subject to appropriate compensatory measures (regulation 49). This has to be agreed by Scottish Ministers. It may also require consultation with the European Commission.

Source: Countryside Council for Wales, English Nature, Environment Agency & RSPB 2004. Strategic Environmental Assessment and Biodiversity: Guidance for Practitioners. (<http://www.environment-agency.gov.uk>)

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Annex 4 CASE STUDY. APPROPRIATE ASSESSMENT OF THE DRAFT SURREY WASTE PLAN

These extracts have been taken from the report *Habitats Directive Assessment of Potential Impacts of submission draft Surrey Waste Plan on Natura 2000 and Ramsar Sites*.² The draft Surrey Waste Plan (*hereinafter*: “the Plan”) sets out policies and proposals for the development of waste management facilities in Surrey County, the UK, for the period up to 2016. The Plan provides a robust planning framework for sustainable waste management and for the construction of new facilities in Surrey. The Plan does not prescribe which waste management technologies should be used and there are no specific and detailed development proposals at any of the sites. The assessment report presents the findings of Appropriate Assessment of the Plan on the designated European sites of nature conservation importance.

All Natura 2000 sites were initially identified within the Surrey County but, those that will not be affected by the Plan were excluded during the screening process (see Figure 1). In the subsequent steps the remaining sites were considered further and assessed against the Habitats Directive. The Natura 2000 and Ramsar sites which are potentially affected by site allocations for waste development in Surrey are presented in Table 1 below.

The assessment identifies the following potential sources of impact on the integrity of the sites which may arise from the construction or operation of facilities proposed in the Plan:

- landtake;
- air emissions from road traffic and stack emissions (including dust);
- noise from road traffic and operation of the plants;
- water discharges;
- pests;
- litter; and
- human presence.

Potential impacts from surrounding developments have also been considered in the assessment report.

The impacts from the waste related development proposed in the Plan are summarised as follows:

“The main potential for impacts was considered to result from air emissions from thermal processing facilities. The assessment, based on a large and hypothetical incineration facility, has shown that it cannot be concluded that there would be no adverse effects on the integrity of the Natura 2000 and Ramsar sites from the estimated stack emissions from such a development sited at Heather Farm, Martyrs Lane and Wisley. As a

² Surrey County Council 2007. Habitat Directive Assessment of Potential Impacts of Submission Draft Surrey Waste Plan on Natura 2000 and Ramsar Sites Report (available at: http://www.surreycc.gov.uk/sccwebsite/sccwspages.nsf/LookupWebPagesByTITLE_RTF/Surrey+Waste+Plan++Habitat+Directive+Assessment?opendocument)

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consequence of this, it is recommended that these sites are removed from the submission draft Surrey Waste Plan for development of thermal treatment plant.

In respect of such development at sites Charlton Lane and land adjacent Trumps Farm, the assessment concludes that an adverse effect on the integrity of the Natura 2000 and Ramsar sites is not likely to occur.

The assessment also concluded that as a result of development, the proposed emissions from traffic from all waste related development has been shown to be unlikely to result in an adverse effect on the integrity of the Natura 2000 or Ramsar sites.

In respect of emissions from dust; the proposed developments can be enclosed in buildings, which would contain any emissions such that they can be ameliorated at source. Additionally, through the use of standard operational measures, incorporating dust suppression techniques, it has been concluded that no adverse effects on the integrity of the Natura 2000 and Ramsar sites will occur from dust generated by development at sites Heather Farm, Wisley or Oak Leaf Farm.

The majority of the development sites are located close to major roads and the increase in traffic levels from the proposals will be small as a result. Adverse effects on the integrity of Natura 2000 and Ramsar sites from traffic noise are not predicted to occur. At Heather Farm, it is considered unlikely that the qualifying interest species will be present in areas closely affected by any increase traffic noise. There is the potential for buildings to enclose the majority of the works and hence noise from operations is not predicted to have adverse effects.

Consideration of impacts from landtake, water discharges, pests and predators, litter and human disturbance from waste related development concludes that there will be no adverse effect on the integrity of the Natura 2000 and Ramsar sites.”

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Annex 5 Sustainable regional development themes of the “Regions for economic change” project

Theme 1: Making Europe and its regions more attractive places to invest and work

THEME	MEASURES TO BE SUPPORTED BY THE EU FUNDS IN THE OPERATIONAL PROGRAMS
Improving air quality	<p>1) <i>Clean technologies and environmental management systems reducing the emission of atmospheric pollutants:</i></p> <ul style="list-style-type: none"> • particulate matter, NO₂ and CO from transport and industry; promoting alternative fuels; • Other atmospheric pollutants (such as SO₂, ozone, heavy metals, hydrocarbons-HC and volatile organic compounds-VOC). <p>2) <i>Integrated air quality plans and strategies</i></p> <ul style="list-style-type: none"> • Integrated approaches at local/regional level for different sources of pollution
Moving to a low carbon economy	<p>1) <i>Heating and cooling for SMEs and public buildings:</i></p> <ul style="list-style-type: none"> • Improved energy efficiency: eco-innovation, environmental technologies and management systems reducing GHG, cogeneration, district heating; • Renewable energy: increased production and use of RES (solar, biomass, waste incineration); <p>2) <i>Integrated energy efficiency and renewable energy plans and strategies</i></p> <ul style="list-style-type: none"> • Integrated approaches at local/regional level based on energy efficiency and the use of RES, for instance: <ul style="list-style-type: none"> ✓ In urban areas (cogeneration, district heating), ✓ In rural areas (small power stations using biomass -forestry products and waste), • Removing bottlenecks in cross-border infrastructure could be included in these approaches
Energy efficient housing stock	<p>1) <i>Technical and non-technical barriers and innovative solutions to improve energy efficiency of existing residential buildings</i></p> <ul style="list-style-type: none"> • Best practices of diagnostic methods (energy performance of the building, certification, energy efficiency audit ...); • Solutions to be assessed against criteria (e.g. cost-effectiveness, energy-efficiency gains, contribution to sustainable development, local acceptance etc.); • “Passive house” or “climate-house”;

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	<ul style="list-style-type: none"> • Improvement of the skills of service suppliers ; • Developing of criteria for monitoring of the results and its application <p>2) <i>Improve the information of the end users, house owners, local authorities via trainings</i></p> <ul style="list-style-type: none"> • Permanent structures to disseminate information and strengthen individual skills • Ways to encourage individual owners to improve the energy performance of their housing stock ; • Developing or improving the coordination between the stakeholders – local authorities, house owners/associations, bank sector; • Exchange and learning from the best practices across EU ; • Decrease of administrative burden. <p>3) <i>Integrated action plans for sustainable and energy efficient housing stocks at local/regional levels</i></p> <ul style="list-style-type: none"> • Surveys of long term evolution of markets and evaluation of the quantitative and qualitative needs ; • Evaluation of the available financial sources; • Identification of the best practices for providing project financing and tailoring them to the local conditions ; • Promoting a cooperation of owners (e.g. housing associations) • Increasing cooperation with other key stakeholders (e.g. suppliers companies, financial institutions) ; • Development of Public-Private Partnerships ; • Developing of criteria for monitoring of the results and its application
Urban transport	<p>1) Integrated collective transport in urban and sub-urban areas such as <i>railway connections, Park & Ride facilities and passenger terminals</i></p> <p>2) <i>Sustainable urban mobility plans</i> that cover urban and sub-urban areas looking at passenger and freight transport in an integrated way</p> <p>3) Successful <i>coordination</i> of mobility policy with land use planning and construction in urban and sub-urban areas</p> <p>4) The use of <i>clean vehicles and alternative fuels</i> in urban transport</p>
Improving monitoring of	<p>1) Integrate space and ground/sea based geo-spatial data so to develop customized information systems in various areas:</p>

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environment and security by and for the regions	<ul style="list-style-type: none"> ✓ cross border spatial planning (for transport infrastructure, tourism development, land monitoring) ✓ emergency responses (focused on common risks areas such as mountain regions, cross border rivers, etc.). <p>2) Development of innovative firms in high tech services industries and the creation of cross border geospatial interoperable solutions.</p>
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Theme 2: Improving knowledge and innovation for growth

Improving the capacity of regions for research and innovation	<ol style="list-style-type: none"> 1) identify opportunities for developing and utilizing <i>regional potential</i> for RTD; 2) integrating the <i>research and innovation capacity</i> into sustainable development strategies; 3) Creation of <i>efficient regional innovation systems</i> based on analysis of a region's research capacities, industrial and employment structure, human resources, infrastructure (including virtual infrastructure), financial market, education and training facilities, business and innovation support services, etc.; 4) fostering <i>clusters of excellence</i>; 5) Improve <i>accessibility</i> of regional RTD supply to firms, especially SMEs; 6) <i>fostering ICT infrastructures</i> to enhance regional research capacities and to enable <i>collaboration</i>
Bringing innovative ideas to the market more quickly	<ol style="list-style-type: none"> 1) Innovation support services for SMEs such as venture contests and training seminars for innovative SMEs; 2) Clusters, networks, incubators and living labs bringing together universities, research institutions, enterprises and end user communities at regional and local levels; 3) Support to innovative start-ups in knowledge intensive services.

Theme 4: The territorial dimension of European Cohesion Policy

Managing coastal zones	<ol style="list-style-type: none"> 1) Adaptation to climate change and risks 2) Management of the land-sea interface and marine areas
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<p>Achieving sustainable urban development</p>	<p>1) <i>Integrated urban development plans</i></p> <ul style="list-style-type: none"> • Integrated interventions to improve the physical environment and the infrastructure of urban areas • Improving the social and educational quality of urban areas • Measures to increase the employability, human capital, mobility and connectivity of the residents • Developing tailor-made, integrated actions for the development of specific urban areas (e.g. inner-city areas, historical centres, pre-fabric housing estates, urban zones at the risk of deprivation) <p>(2) <i>Improving the environmental quality and the energy efficiency of/in urban areas</i></p> <ul style="list-style-type: none"> • Promoting energy-efficient urban infrastructures to reduce the consumption of natural resources • Promoting the sustainable use of natural resources and environmentally friendly materials for urban planning and design • Creating awareness to reinforce environmental actions in distressed urban areas <p>(3) <i>Good local and multi-level-governance and innovative working methods for integrated urban development</i></p> <ul style="list-style-type: none"> • New approaches and governance models for coordinating sectoral policies relevant to cities • Training in planning and management tools for ensuring delivery of results • Training and qualification schemes for local actors and political stakeholders to develop and implement integrated urban development plans • Actions to promote equal opportunities and gender mainstreaming within urban development processes • Improving urban safety with respect to natural and man-made risks
<p>Re-using brownfield and waste disposal sites</p>	<p>1) <i>Best practice on physical rehabilitation of brownfield sites and improving the attractiveness of urban areas</i></p> <ul style="list-style-type: none"> • tools and technologies for cost effective assessment and decontamination of brownfield sites • Economic and social incentives for brownfield rehabilitation • Integrating brownfield regeneration projects into the urban setting. <p>(2) <i>Coordinating land-use policies and EU funding and avoiding the use of greenfield sites</i></p> <p>(3) <i>Development of partnerships between relevant actors, including public participation, within the framework of integrated and coherent approaches to urban development (governance)</i></p>

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- Communication strategies for brownfield rehabilitation and awareness raising to enhance brownfield rehabilitation and to combat the depletion of greenfields
 - Tools to identify brownfields and to prioritise their rehabilitation
 - Information and monitoring systems
- (4) Waste disposal sites, landfills and historical mining waste disposal sites*
- Tools and techniques for inventories (identification and assessment) of uncontrolled dumpsites still in use and of historical waste disposal sites
 - Rehabilitation of such sites

Source: Regions for economic change – exchanging good practice between Europe's regions

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Annex 6 Checklist for assessing EU projects applications in Spain

LOCAL AND URBAN DEVELOPMENT

Does it improve and promote public transport?

Does it increase the area of public streets intended for pedestrian use?

Does it prevent or avoid the abandonment of historic city centres and old quarters and promote the regeneration of degraded urban areas?

Does it avoid the invading of fertile rural land?

Does it encourage natural and physical interaction between the urban and rural environments by maintaining fluid boundaries?

Does it take into account social considerations for the integration of marginalised or degraded districts?

Does it promote the rational and sustainable use of resources (water, energy, land)?

Does it take into account the problems of scarcity and irregularity in the water supply that affect certain regions and areas?

Is land use management compatible with the environment, with the carrying capacity of the affected territory and with local environmental conditions and resources?

Does it introduce provisions aimed at eliminating the most serious environmental problems (transport, water, wastes, wastewater treatment, space...)?

Does it represent a diversified offer to tourists which favours the improved use of resources (cultural, natural, etc.)?

Does it promote diversified training in the tourist sector in order to make better use of existing resources, while at the same time promoting new resources?

Does it contribute to the development of ecological tourism and tourism in rural and farming areas.

Does it promote vocational training in new tourist destinations linked with nature tourism, agrotourism and cultural tourism?

TRANSPORT AND ENERGY NETWORKS

General considerations

Does it favour the railways, short distance maritime transport or river transport, in preference to the transportation of goods and passengers by road?

Does it shorten distances and cut journey times?

Does it have beneficial effects on territorial integration and planning?

Does it promote transport intermodality and modal interchange systems?

If the project includes or refers to the construction of roads or motorways:

Does it benefit routes that use established communication corridors rather than opening up new ones?

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Do the project proposals imply specific requirements related with construction plans with regard to landfills, loan materials and rubble tips and their integration in the landscape?

Do the project proposals imply specific requirements related with embankment stabilisation and plant cover?

Do the project proposals imply specific requirements to avoid increasing runoff and erosion during and after construction?

Do the project proposals imply specific requirements regarding the controlling of noise (above all on sections that pass through inhabited areas), dust emissions that affect the environment and water quality (decanters)?

Does it include an analysis of the impact of atmospheric and acoustic pollution on urban and residential areas, schools, hospitals, etc.?

Does traffic originated by the new project have a negative impact on existing or foreseen public transport infrastructures?

In the case of city ring roads, is the creation of uncrossable barriers between the urban and rural environments avoided or minimised?

If the project includes or refers to the construction of infrastructures for short distance rail transport:

Does the project analyse the expected benefits with regard to reductions in private transport?

Have measures been taken to reduce pollution and noise in the construction and operational phases?

If the project includes or refers to port works and/or harbour installations:

In addition to the mandatory environmental impact assessment, has the potential impact of the project on adjacent areas been evaluated (beach erosion, changes in coastal dynamics)?

Does it include the facilities envisaged in international conventions for the collection and disposal of waste oils and solid wastes?

Are systems foreseen for the cleaning of the water surface?

Does it include specific infrastructures that follow the European Union transport policy which recommends the promotion of short distance maritime transport (cabotage) in order to compensate the increase in road transport?

Does it favour permeability and harmonious integration between port facilities and the urban environment?

If the project includes or refers to airport works or installations:

Does it adopt corrective measures concerning acoustic and atmospheric pollution?

Does it promote in an integrated way the different modes of transport and guarantee access to the airport by public transport?

Has consideration been made of needs regarding waste management and the treatment of wastewater from the airport?

If the project includes or refers to other aspects of transport:

Does it guarantee the priority of public transport?

Does it address matters of energy consumption, access and travel time?

If the project is considered to be linked to the ENERGY sector:

In the routes envisaged for gas and energy pipelines, have sensitive areas that require detailed evaluation been identified?

Does it promote renewable energies?

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Does it allow and facilitate the use of less polluting energies?

Does it optimise energy investments by considering environmental and social benefits?

Does it reduce dependence on external energy sources?

Does it promote energy efficiency?

Does it promote the use of the most efficient combustion technologies available?

Does it promote clean technologies?

Does it promote greater awareness of consumers in energy saving programmes?

Source: Spanish Environmental Authorities Network. 2001. Guidelines for managing authorities and environmental authorities

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Annex 7 Fundamental Principles of Sustainable Development

(1) Holistic view of society, the environment and the economy. Each of the authority's activities is underpinned by simultaneous regard for the interests of society, the environment and the economy. The three areas must be included in the survey of the current situation, the vision, the objectives and the action plan. All three are also enshrined in the management and evaluation tools and represented among the various actors involved, either in project management or participatory processes.

(2) Adapted to local circumstances, yet embedded in a global vision. The process is adapted to local conditions. It takes account of the local environmental, social, economic and cultural circumstances while being compatible with a global sustainable development vision. In this respect, it accommodates global issues.

(3) Long-term vision. The process takes a long-term outlook. The authority creates a vision of the future state it would like to attain, the decision-making bodies have strategic management tools which extend beyond the term of office and the action plan contains long-term objectives. Present-day problems are not resolved to the detriment of tomorrow's generations, and future problems are anticipated.

(4) Process triggers. Often, a sustainable development process is motivated by a particular factor that can be used to good effect. This may be a particularly critical situation that the municipality is experiencing (crime, exodus of taxpayers, deterioration in quality of life), major blocks in the usual political process or even, for example, a loss of identification between the people and the municipality in which they live – all problems to which a sustainable development process can provide appropriate responses. The initiation of a proactive consultation process (planning, promotion of the municipality as a business location, etc.) is an equally effective trigger in itself.

(5) Political commitment of the authorities. Political commitment is an important starting signal. It is the basis for asserting the will of the authorities to embark upon such a process, communicating that will to the public at large and enabling everyone to get involved in the knowledge that his or her work enjoys political backing.

(6) Structuring the process and responsibilities. The course of the process is structured and planned from the outset. Responsibilities are defined and accepted. The actors involved are aware of the successive stages of the process and of the objectives.

(7) Taking stock. The authority takes stock of the economic, social and environmental situation and analyses its strengths and weaknesses. This step might, for example, take the form of a sustainability audit, a system of indicators and/or a participatory survey.

(8) Objectives. The authority's actors define the objectives for their authority's sustainable development, in the short and medium term. These objectives are consistent with the vision and fundamental principles for the authority's sustainable development. They can be used to ensure that the actors approve of the goals of the process and to then verify whether or not the objectives have been achieved, in order that corrective measures can be taken if necessary.

(9) Political approval. The process and the objectives are approved at the political level, thus legitimising them. Next, the planned measures are also approved, for both political and budgetary reasons.

(10) Coherent action plan. A sustainable development process involves a concrete action plan. These measures enhance the authority's sustainability, help raise awareness among the actors concerned and are the means of acquiring the skills and expertise necessary for sustainable development. It must be ensured that the action plan embraces the three dimensions of sustainable development (social, environmental and economic) and that it comprises both short and long-term measures so as to maintain momentum while aiming for a general, long-term

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improvement. Care will be taken to properly define the targets and objectives of each measure, clarify priorities and responsibilities, and establish a budget and a realistic schedule.

(11) Implementation. The action plan must be more than just a piece of paper: It must be put into practice. Implementation must be handled with care and a degree of visibility, as each measure realised provides the motivation for subsequent efforts.

(12) Controlling/evaluation. A controlling and evaluation system must be set up in order to guarantee the continuous improvement process and monitor its quality. It is essential to verify that the declared objectives have been duly achieved, and to evaluate how they have contributed to the authority's sustainable development. By combining the results of this analysis with the updated data from the status report (monitoring), corrective measures can be defined and new initiatives launched.

(13) Multidisciplinary teams. The various projects (the process itself or individual measures) are led by multidisciplinary teams, who offer wide-ranging knowledge, skills and expertise that are both diverse and complementary. The members of a team are chosen to reflect the needs of the project.

(14) Cross-cutting approach. Structures and processes are put in place in the organisation so as to take a cross-cutting and effective approach to projects. Actors from different agencies and departments collaborate without administrative constraints.

(15) Networking of actors. The process enables public and private actors to collaborate and local people, various stakeholders and businesses to become actively involved. The actors involved know each other and can develop a joint network in the interests of the authority.

(16) Communication. The objectives, progress, content and results of the process are communicated to a wide audience in terms that are universally accessible. The authority's various actors are familiar with the process and the progress achieved thus far.

(17) Transparency. The process and projects are conducted in a transparent way, facilitating automatic monitoring and fostering a climate of trust.

(18) Participation. Participatory processes are encouraged. These can help anticipate implementation problems, use the population's knowledge of the local context and involve the public in the realisation of the process. However, these processes must be carefully prepared and must not be designed simply to pay lip service to the idea of participation.

Participation is also encouraged with regard to the process as a whole, especially during the stock-taking process and when defining the vision or preparing the action plan.

(19) Awareness-raising. The projects that are implemented are not designed solely to make the authority more sustainable, but make a major contribution to raising awareness among the various sustainable development actors. Moreover, awareness-raising is an important preliminary stage of the process, with a view to mobilising the greatest possible number of actors.

(20) Encouraging learning. Lessons are learned from experience gained during the process or related projects and shared with the community's various actors. The process serves as a testing ground and promotes the acquisition of a sustainability mindset through the sharing of experience.

(21) Institutionalisation of the process. The sustainable development process is institutionalised. Roles and responsibilities are attached to functions, rather than just to people. The stages of the process are incorporated into the running of the municipality (for instance, by including the objectives of the process in the legislative agenda).

(22) Integration of the principles of sustainable development into all public action. The experience gained and tools and processes developed within the process must be integrated to maximum effect into everyday administrative and political management. This ensures maximum impact and secures the long-term future of the process, regardless of fashions or individuals. The objectives of sustainable development are enshrined in

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public policies and

administrative tools such as strategic plans, laws, regulations and the legislative agenda.

(23) Appropriate tools. The tools necessary for implementing sustainable development objectives are developed and employed in an efficient and consistent manner. In particular, this includes monitoring tools (indicator systems, audits, etc.), strategic management tools (performance indicators etc.), integrated management tools (finances, environment and society) and evaluation tools (project/process evaluation, etc.).

(24) Skilled actors. The actors are familiar with the objectives of sustainable development and have the skills and expertise to put them into practice in their day-to-day work. Ongoing training provides a forum for sharing experience and developing general knowledge and skills.

(25) Clear organization. The process is governed by clear structures and a detailed organisation chart. Its links with the authority's administrative and political structure are precisely defined. The tasks and functions are defined independently of individuals, to ensure continuity.

(26) Well-defined roles and responsibilities. Each person knows what his or her role and responsibilities are, and they are clearly communicated. Roles and responsibilities are compatible with personal capabilities, as well as the other functions performed by each actor in the community (political responsibility, personal interests, etc.).

(27) Political support. Political support is vital. It must be sought at the earliest possible stage in the process, then carefully maintained. The measures will have to be politically approved and the financial and human resources allocated. Political circles must not perceive the sustainable development process as a rival effort.

(28) Availability of financial and human resources. Although part of the process can sometimes be realised with the aid of external resources (voluntary work, specific agencies affected, etc.) it is nonetheless important to have sufficient financial and human resources available for coordination, planning and controlling activities. The measures themselves also require resources – for implementation, communication and enhancement.

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Annex 8 Indicators for climate change

Domain	All domains
Indicator	Total GHG emissions
Definition/Type	<p>This indicator shows trends in anthropogenic emissions of greenhouse gases (GHG). The indicator is based on the aggregated emissions of the 'Kyoto basket' (6 greenhouse gases weighted by their global warming potentials (GWP), in 1000 tonnes CO₂-equivalents) divided by the emissions in the base year:</p> <ul style="list-style-type: none"> • carbon dioxide (CO₂), • nitrous oxide (N₂O), • methane (CH₄), • hydrofluorocarbons (HFCs), • perfluorocarbons (PFCs) • sulphur hexafluoride (SF₆).
Measurement unit	1000 tonnes CO ₂ -equivalents
Methodology	<p>The basic data is annual greenhouse gas (GHG) emissions estimated and reported according to the revised 1996 Intergovernmental Panel on Climate Change (IPCC) guidelines. By using global warming potential concept, all 6 GHGs can be summed up to a single number per year. The GWP relates to the ability of the different gases to contribute to global warming over a 100 year time horizon. GWPs are provided by the IPCC.</p>
Policy relevance	<p>This indicator is linked to many other socio-economic and environmental indicators, including GDP growth rate, energy consumption, environmental protection expenditures, and expenditures on air pollution abatement.</p>
Limits/Uncertainty	<p>The indicator does not include ozone depleting substances with global warming properties covered by the Montreal Protocol (1997).</p>

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	<p>Also, the indicator does not include the impact of land use changes and forestry. The removal of GHG from the atmosphere by different sinks (forestry, oceanic uptake) is one the most controversial issues in climate change studies. The missing carbon sink is as large as the oceanic uptake and the net emissions from changes in land use. This indicator shows the net amount of GHGs entering the atmosphere for each reporting country each year. It does not show how much the climate will be affected by the increased accumulation of GHGs or the consequent effect of climate change on countries. Data is available and reported mainly for developed countries and economies in transition.</p>
Source	<ul style="list-style-type: none"> • Eurostat, Statistical Office of the European Communities, • Unit E3 Environment statistics • EEA • CSD
Availability of data from international sources	<p>EUROSTAT. http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/&product=STRIND_ENVIRO&depth=2 CSD. http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/isdms2001environmentalA.htm#emissions</p>

Domain	Energy, Transport
Indicator	Global and European temperature
Definition/Type	The indicator shows trends in annual average global and European temperature and European winter/ summer temperatures (all compared with the 1961-1990 average). The units are degrees C and degrees C per decade.
Measurement unit	Degrees Celsius and degrees Celsius per decade

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Methodology	<p>Four data sets on trends in global and European temperature have been used for this indicator:</p> <ol style="list-style-type: none"> 1. Global average monthly and annual temperature from Climatic Research Unit (CRU) University of East Anglia, UK. The data set is a global average temperature increase, given per month for the period 1851-now. Reference period is 1961-1990 average. Unit is degrees Celsius. 2. European average annual and monthly temperature, is the European subset of Dataset 1 prepared by using the routine of the climate explorer of the Netherlands Meteorological Office KNMI (using a 35-70 N latitude and -15 - 65 East longitude grid). 3. Trends in annual, summer and winter temperature station data in Europe from European Climate Assessment (ECA) programme. The data set represents the decadal change in mean annual, summer and winter temperature at different meteorological stations across Europe. The time period is 1976-1999. 4. Trends in the frequency of summer days (>25 degrees C) and cold, and heat wave occurrence, based on station data in Europe from European Climate Assessment (ECA) programme. 5. Projected trends are based on 6 IPCC scenario's (Intermediate ACACIA scenario) and are available in IPCC WG2 report Climate change 2001 Impacts, adaptation and vulnerability, Cambridge University Press, Cambridge UK <p>Data are extracted from the programmes, and data sets 1 and 2 are used to illustrate global and European trend in temperature, respectively. Datasets 3 and 4 are used to illustrate temperature extremes: Cold and warm days are the 10th (= the average temperature of the 36 coldest days) and 90th percentile (=the warmest 36 days) of daily mean temperature, respectively. The index is expressed as anomalies relative to the climate normal average (i.e.1961-1990). More: http://themes.eea.europa.eu/IMS/IMS/ISpecs/ISpecification20041006175027/full_spec</p>
Policy relevance	<p>Temperature is directly linked to climate change and is a state variable that changes in response to the pressures of global warming. Surface air temperature gives one of the clearest signals of climate change. The European Council proposed in its Sixth Environmental Action Programme (6EAP, 2002), reaffirmed by the Environment Council and the European Council of March 2005, that the global average temperature increase should be limited to not more than 2 degrees C above pre-industrial levels (about 1.3 degrees C above current global mean temperature).</p>
Limits/ Uncertainty	<p>There is a generally agreed methodology with low uncertainty. Data sets used for the indicator have been checked (by CRU, UK) and corrected for changing methodologies and location (rural in the past, now more urban). The uncertainty is larger for projected temperature changes, partly resulting from a lack of knowledge of parts of the climate system, including climate sensitivity (temperature rise that results from doubling CO₂-concentrations) and seasonal temperature variability.</p>
Source	<ul style="list-style-type: none"> • Eurostat • EEA
Availability of	<p>Eurostat, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-77-07-115/EN/KS-77-07-115-EN.PDF</p>

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data from international sources	
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Domain	All domains
Indicator	Projection of GHG emissions and removals
Definition/Type	This indicator illustrates the projected trends in anthropogenic greenhouse gas emissions in relation to the EU and Member State targets, using existing policies and measures and/or additional policies and/or use of Kyoto mechanisms. Greenhouse gas emissions are presented by type of gas and weighted by their global warming potentials.
Measurement unit	Million tonnes in CO ₂ -equivalent
Methodology	Projected progress calculates the gap between emission projections and the Kyoto target. Two types of projections are considered: (1) with existing measures projections and (2) with additional measures projections. In addition, for those Member States which provided the relevant information, the use of Kyoto Mechanisms is considered in the progress assessment. Further detail available in the report: "Analysis of greenhouse gas emission trends and projections in Europe 2004" Chapter 4.
Policy relevance	It responds to the question of what is the progress in reducing GHG emissions towards the Kyoto Protocol targets in Europe, taking into account current domestic policies, measures and Kyoto mechanisms. What are the emissions changes by sector and what are the emissions changes by GHGs?
Source	EEA
Availability of data from international sources	EEA, http://themes.eea.europa.eu/IMS/IMS/ISpecs/ISpecification20041006175027/IAssessment1116322231704/view_content EEA, http://themes.eea.europa.eu/IMS/IMS/ISpecs/ISpecification20041007131701/full_spec

Domain	Climate, Soil, Agriculture
Indicator	Climate Quality Index
Definition/Type	Structural analysis 1961-1990. Climate data in DISMED will be based on the aridity index, which requires a harmonized way of computing evapotranspiration, that at present differs among countries. In this respect FMA will be in charge of defining the most suitable algorithm(s) concerning evapotranspiration and the correct time frame, which depends on the

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	available data and on the methodological approach adopted
Methodology	Aridity Index = P (Yearly mean rainfall) / PET (Yearly mean potential evapotranspiration). Data spatialization procedures: Rainfall spatialization procedure: - Kriging interpolation Temperature spatialization procedure: - Multilinear regression using DEM, Latitude, Longitude and sea distance PET calibration procedure: - monthly calibration of Thornthwaite PET values with Penman-Monteith PET values : kriging interpolation of the ratio between the two estimated PET to obtain 12 correction grids
Source	EEA
Availability of data from international sources	http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=612

Domain	Energy
Indicator	Energy dependency
Definition/Type	Energy dependency shows the extent to which an economy relies upon imports in order to meet its energy needs.
Measurement unit	Net imports divided by the sum of gross inland energy consumption plus bunkers
Policy relevance	The Green Paper on a European strategy for sustainable, competitive and secure energy (66) describes security of energy supply, together with sustainability and competitiveness, as the three main objectives for EU energy policy.
Source	Eurostat
Availability of data from international sources	Eurostat, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-77-07-115/EN/KS-77-07-115-EN.PDF

Domain	Energy
Indicator	Combined heat and power
Definition/Type	This indicator is defined as the share of electricity from combined heat and power (CHP) generation as a percentage of gross electricity generation
Measurement unit	% of gross electricity generation
Policy relevance	Combined heat and power or cogeneration is a technology used to improve energy efficiency through the simultaneous generation of heat and power in the same process. Heat delivered from CHP plants may be used for process or space-heating purposes in any sector of economic activity including the residential sector. CHP thus reduces the need for additional fuel combustion for the generation of heat and avoids the associated environmental impacts, such as CO ₂

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	emissions.
Source	Eurostat
Availability of data from international sources	Eurostat, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-77-07-115/EN/KS-77-07-115-EN.PDF

Domain	Energy efficiency
Indicator	Energy intensity
Definition/Type	The indicator measures energy consumption (gross inland consumption) per unit of GDP. It measures the energy consumption of an economy and its overall energy efficiency. The indicator gives a picture of the decoupling of energy use from GDP growth. Changes in the indicator reflect changes in energy efficiency and in the structure of the economy. The Gross Inland Consumption of Energy is calculated as the sum of the Gross Inland Consumption of the five types of energy: coal, electricity, oil, natural gas and renewable energy sources. In addition, each of these figures is calculated as an aggregation of different data on production, storage, trade (imports/exports) and consumption/use of energy.
Measurement unit	The Gross Inland consumption is measured in kgoe (kilogram of oil equivalent), while GDP is measure in 1000 EUR. The GDP figures are taken at constant prices to avoid the impact of the inflation, being the base year 1995 (ESA95). Finally, the energy intensity ratio is measured in kgoe/1000 EUR
Methodology	All necessary data is compiled through five annual Joint Questionnaires (one for each type of energy above-mentioned). These questionnaires are called « joint » because they are shared by Eurostat and the International Energy Agency (organisation that belongs to the OECD). This means that the methodology is completely harmonised for all EU and OECD countries, including the USA and Japan. For the EU-Member States, Candidate countries and EFTA countries the provision of data is based on a gentlemen's agreement.
Policy relevance	This indicator is of use in tracking progress towards a number of sustainable development objectives such as environmental protection, achieving the Kyoto commitments by reduction in greenhouse gas emissions and improvement of the environmental performance of processes.
Limits/Uncertainty	The relevance is restricted as GDP is calculated in Euro which affects comparability in particular with the US and Japan through exchange rate effects. Also, in some countries gains emissions were increasing despite gains in energy efficiency (OECD 2007).
Source	<ul style="list-style-type: none"> • Eurostat • DG Environment – 2006 Annual Environmental Policy Review
Availability of data from international sources	http://ec.europa.eu/environment/policyreview.htm

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Domain	Energy
Indicator	Electricity produced from renewable energy sources
Definition/Type	<p>This indicator is the ratio between the electricity produced from renewable energy sources and the gross national electricity consumption calculated for a calendar year. It measures the contribution of electricity produced from renewable energy sources to the national electricity consumption.</p> <p>1. Renewable energy sources. They are defined as renewable non-fossil energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.</p> <p>2. Electricity produced from renewable energy sources. It comprises of the electricity generation from hydro plants (excluding pumping), wind, solar, geothermal and electricity from biomass/wastes. Biomass/wastes electricity comprises of electricity generated from wood/wood wastes and other solid wastes of renewable nature (straw, black liquor) burning, municipal solid waste incineration, biogas (incl. landfill, sewage, farm gas) and liquid biofuels.</p> <p>3. Gross national electricity consumption. It comprises of the total gross national electricity generation from all fuels (including autoproduction), plus electricity imports, minus exports.</p>
Measurement unit	%
Methodology	Data is compiled through annual Joint Questionnaires (one for electricity and another one for renewable energy sources). These questionnaires are called " joint " because they are shared by Eurostat and the International Energy Agency (IEA, part of the OECD). The methodology is fully harmonised between both organisations.
Policy relevance	This indicator is relevant to the reduction of CO2 emissions (Kyoto engagements/environmental policies) and may also contribute to secure energy supply for electricity generation.
Limits/Uncertainty	Energy use from non-renewable sources can have a damaging effect on the environment and on the sustainability of economic growth so it needs to be taken into account in policy-making.
Source	Eurostat International Energy Agency
Availability of	EUROSTAT. http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&scr

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data from international sources	een=welcomeref&open=/&product=STRIND_ENVIRO&depth=2
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Domain	Energy
Indicator	Energy production or savings and installed capacities.
Definition/Type	Project level
Methodology	<p>These data are usually available from GEF project reports, published government data, or published industry or market reports (low cost).</p> <p>For some project clusters, data may need to be obtained from local unpublished sources or industry observers (medium cost). Energy savings figures will be readily available for direct project outputs (low cost) but may not be available at all on a national or industry wide basis (high cost), or may require limited sampling of installations in the field (medium cost). Energy savings from utility demand-side management (DSM) projects using national electric power utilities should be readily available (low cost). Energy savings figures will generally be unavailable at the international level.</p>
Source	GEF
Availability of data from international sources	http://www.undp.org/gef/undp-gef_monitoring_evaluation/sub_undp-gef_monitoring_evaluation_documents/Climate%20Change%20Indicators.pdf

Domain	Energy / Climate
Indicator	Financing availability and mechanisms
Definition/Type	Program level indicator, which shows the number of financing programs and mechanisms dedicated to target measures, should be available from government and donor agencies (low cost).
Measurement unit	EUR
Methodology	<p>Surveys of commercial banks as to their lending patterns, interest rates, and views of specific technologies, as well as industry views on the availability of financing would require much greater resources (medium to high cost), as well as governmental funding schemes, flexible mechanisms of the Kyoto protocol on emissions outside the national territory, structural funds, etc.</p>
Source	GEF

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Availability of data from international sources	GEF, http://www.gefweb.org/interior_right.aspx?id=234
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Domain	Economy
Indicator	Nº of companies supported to install renewable energy technologies
Definition/Type	This involves a grant or some other form of material assistance provided by the governmental program / private donor for the installation of a system or part of a system of renewable energy technology, e.g. solar power, wind or water power, wood burning from renewable sources like biomass; energy from waste or landfill gas.
Measurement unit	Nº
Methodology	The governmental authorities / private donors should provide information on the number of companies receiving grant aid or some other form of assistance that has led them to install this technology.
Policy relevance	Program level indicators
Source	GRDP
Availability of data from international sources	http://www.environment-agency.gov.uk/grdp/1393647/?lang=_e

Domain	Economy
Indicator	Nº of SMEs involved in energy efficiency/renewable Energy
Definition/Type	'Involved in' refers to SMEs either actually having an up and running scheme or being engaged in the process of review or the preparation of an action plan which would lead to a more efficient use of energy, the installation of a renewable energy power source (see above) for all or part of their operation, etc. For these purposes involvement with renewable energy can include taking their energy from a power company which supplies this source of energy.
Measurement unit	Nº
Methodology	Governmental authorities / private donors should provide information on number of SMEs actively involved in these programmes, what the scheme is and, where applicable, details of any reduction in energy or waste costs, or proportion of energy from renewable sources
Policy relevance	Program level indicator
Source	GRDP
Availability of data	http://www.environment-agency.gov.uk/grdp/1393647/?lang=_e

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from international sources	
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Domain	Economy
Indicator	Nº of SMEs developing environmental products
Definition/Type	Environmental products are any kind of energy saving products / services and renewables, i.e. insulation and solar panels
Measurement unit	Nº
Methodology	Governmental authorities / private entities should report on number of new or redeveloped (e.g. projects marketed more effectively) products developed, resulting in improved environmental performance
Source	GRDP
Availability of data from international sources	http://www.environment-agency.gov.uk/grdp/1393647/?lang=_e

Domain	Institutional
Indicator	Implementation of Framework Convention on Climate Change
Definition/Type	The existence of legislation for the implementation, at the national level, of international agreements related to sustainable development.
Measurement unit	The relationship between laws, policies and other instruments and obligations assumed under the UN Framework Convention on Climate Change and the Kyoto Protocol
Methodology	Implementation is the application of global agreements at the national level through various general and specific measures, including national programs (policies, plans, voluntary agreements with industry, capacity building, etc.), legislation (including laws, decrees, regulations, ordinances, orders, or any other legally-binding measure), financial measures, and institutional arrangements.
Policy relevance	This indicator signifies initial government action to effectively implement ratified international agreements related to sustainable development. Determine the existence of national legislation for the implementation of ratified international agreements. Express the indicator as a ratio between agreements legislated for and agreements ratified.
Limits/Uncertainty	The content of national legislation for the implementation of international agreements can vary from general provisions to specific regulatory requirements. The more detailed the provisions, the greater the likelihood that the agreement will be

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	fully implemented. However, the existence of legislation does not necessarily imply effective implementation or compliance. The indicator is not very suitable for showing meaningful trends.
Source	UNCSD
Availability of data from international sources	http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/isd-ms2001institutional.htm#agreements

Annex 9 Indicators for Biodiversity

Domain	Ecosystems
Indicator	Area of Selected Key Ecosystems.
Definition/Type	This indicator will use trends in the extant area of identified key ecosystems to assess the relative effectiveness of measures for conserving biodiversity at ecosystem level and as a tool to estimate the need for specific conservation measures to maintain the biological diversity in a country or region.
Measurement unit	Area (km ² or ha) of selected ecosystem types.
Methodology	<p>Ecosystem area will normally be derived from mapped data on land cover. This is most efficiently done using data in electronic form and Geographic Information System (GIS) software. Increasingly, land cover maps are derived from remotely sensed data, these will be combined with biological and other ancillary information to produce ecosystem maps. In some cases, retrospective information may be obtained from historical data sets to provide context and longer-term trends. The greatest difficulty is in arriving at an agreed ecosystem classification that is compatible with the available data. It is also fundamental to ensure consistency of the classification and the method of measurement, including considerations of spatial scale and resolution, over time.</p> <p>How and whether data on different ecosystems should be combined into a single indicator has yet to be determined. It is possible that trends in ecosystem area may be combined in ways that are analogous to the approaches used for species population trends.</p>
Policy relevance	The indicator has the potential to illustrate the effectiveness of national measures designed to conserve biological diversity and ensure its use is sustainable, including the measures implemented in fulfillment of obligations

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	<p>accepted under the Convention on Biological Diversity (CBD).</p> <p>This indicator is relevant to many other global agreements for which the maintenance of biological diversity is important, including: Convention on the Conservation of Migratory Species of Wild Animals (Bonn); Convention on International Trade in Endangered Species (CITES); United Nations Convention on the Law of the Sea (UNCLOSS); Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar); Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention).</p> <p>Related regional conventions and agreements include: Convention on the Conservation of European Wildlife and Natural Habitats (Berne); Program for the Conservation of Arctic Flora and Fauna (CAFF); Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).</p>
Limits/Uncertainty	<p>Application of this indicator is constrained by several factors, but these can mostly be overcome if resources and personnel are available. The main factor preventing the immediate and widespread application of this indicator is the scarcity of suitable time-series of land cover data. The reliability of evaluating the extent and uniqueness of ecosystem depends on the detail, quality and compatibility of ecosystem classification applied across continuous terrestrial and marine areas.</p> <p>Ecosystem diversity distribution has not been mapped at an appropriate scale for many areas of high biological diversity. A structured monitoring framework using standardized classification procedures would provide one solution to this problem, but might well not meet the full range of needs for this type of data.</p> <p>The indicator fails to account for variation in ecosystem status other than extent. Perturbations that do not affect total area will not be recognized through monitoring this indicator, nor will it be possible to anticipate likely future trends in ecosystem status through this indicator alone. Measures of ecosystem condition and protection status are needed to answer this deficiency.</p>
Source	UNCSD 2001
Availability of data from international sources	<p>UNEP-WCMC (http://www.unep-wcmc.org).</p> <p>Land cover data are available from Eros Data Centre (http://edcdaac.usgs.gov/glcc/glcc.html) and from the CORINE programme (see http://www.satellus.se).</p>
Domain	Ecosystems
Indicator	Cumulated area of nationally designated areas over time
Definition/Type	All lands and marine territories (disaggregated) under conservation designation of any sort.

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Measurement unit	Area (km ² , ha)
Policy relevance	European policies and initiatives such as the NATURA 2000 Network, the Birds, and the Habitats Directives comprise a series of elements all aimed at achieving biodiversity conservation through land protection. Monitoring trends in area under conservation designation provides a relevant general indicator for biodiversity conservation trends.
Limits/Uncertainty	<p>This indicator does not specify the quality of the ecosystems under designated area status, nor does it measure the effects of management activities. As the ecological value of lands and marine areas varies widely, this indicator is more useful in combination with other indicators, such as the key ecosystems indicator. Some lands may be set aside for intensive management activities, such as timber felling, thereby significantly reducing their value as reserves for biodiversity.</p> <p>This indicator may be relevant to many other global agreements for which the maintenance of biological diversity is important, including: Convention on the Conservation of Migratory Species of Wild Animals (Bonn); Convention on International Trade in Endangered Species (CITES); United Nations Convention on the Law of the Sea (UNCLOSS); Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar); Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention).</p> <p>Related regional conventions and agreements include: Convention on the Conservation of European Wildlife and Natural Habitats (Berne); Program for the Conservation of Arctic Flora and Fauna (CAFF); Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).</p>
Source	EEA
Availability of data from international sources	EEA, Nationally Designated Areas (CDDA, dec 2004), http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=1017 ; European Commission, http://ec.europa.eu/environment/nature/index_en.htm
Domain	Ecosystems
Indicator	Cumulative surface area of sites designated for the Habitats Directive over time
Measurement unit	Area (km ² , ha)
Policy relevance	<p>Meets the objectives and legal requirements of the Habitats Directive and other EC conservation requirements.</p> <p>This indicator may be relevant to many other global agreements for which the maintenance of biological diversity</p>

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	<p>is important, including: Convention on the Conservation of Migratory Species of Wild Animals (Bonn); Convention on International Trade in Endangered Species (CITES); United Nations Convention on the Law of the Sea (UNCLOSS); Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar); Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention).</p> <p>Related regional conventions and agreements include: Convention on the Conservation of European Wildlife and Natural Habitats (Berne); Program for the Conservation of Arctic Flora and Fauna (CAFF); Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).</p>
Limits/Uncertainty	The quality of the areas designated for conservation under the directive is not directly measurable using this indicator, although lands set aside to meet the requirements of the Habitats Directive can be presumed to be of conservation value.
Source	EEA
Availability of data from international sources	EEA, Nationally Designated Areas (CDDA, dec 2004), http://dataservice.eea.europa.eu/dataservice/metadetails.asp?id=1017

Domain	Ecosystems
Indicator	Cumulative surface area of sites designated for the Birds Directive over time
Measurement unit	Area (km ² , ha)
Policy relevance	<p>Meets the objectives and legal requirements of the Birds Directive and other EC conservation standards.</p> <p>This indicator may be relevant to many other global agreements for which the maintenance of biological diversity is important, including: Convention on the Conservation of Migratory Species of Wild Animals (Bonn); Convention on International Trade in Endangered Species (CITES); United Nations Convention on the Law of the Sea (UNCLOSS); Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar); Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention).</p> <p>Related regional conventions and agreements include: Convention on the Conservation of European Wildlife and Natural Habitats (Berne); Program for the Conservation of Arctic Flora and Fauna (CAFF); Convention on the</p>

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	Conservation of Antarctic Marine Living Resources (CCAMLR).
Limits/Uncertainty	The quality of the areas designated for conservation under the directive is not directly measurable using this indicator but areas set aside to meet the requirements of the Birds Directive may be presumed to have conservation value.
Source	EEA
Availability of data from international sources	Pan European Common Bird Monitoring Project, http://www.ebcc.info/pecbm.html

Domain	Species
Indicator	Trends in selected bird and butterfly species
Definition/Type	This indicator measures the abundance of selected species of birds over time.
Measurement unit	Number of birds of particular species counted in a given period of time at a given period of year over a given space. E.g., in Bulgaria the measurement unit used is transect routes in summer on random 1-km squares (n = 130 in 2005).
Methodology	A selection of common farmland and woodland bird species should be assessed by national monitoring schemes. These birds all use these specific habitats during their breeding season and also have a large range across Europe. National monitoring coordinators provide their own assessment - proportion of a species' national population breeding in a given habitat type in four categories (less than 25%, 25 to 50%, 50 to 75%, more than 75%).
Policy relevance	Many species of birds are highly sensitive to land use changes, loss of forest cover, and changes in forest structure and composition, thereby serving as overall indicators of ecosystem health and trends in biodiversity.
Limits/Uncertainty	Lack of time series data. Some states such as Britain have high quality time series data going back many decades, while others such as Bulgaria have only begun to systematically track the abundance of selected bird species in the recent past.
Source	EEA
Availability of data from international sources	Pan-European Common Bird Monitoring project (EBCC, BirdLife Int, RSPB), Dutch Butterfly Conservation, Royal Society for the Protection of Birds

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Domain	Species
Indicator	Trends in selected mammal species
Definition/Type	Trend in abundance per habitat area
Measurement unit	Number of individuals, breeding pairs, or other relevant units
Methodology	Wildlife biologists measure the abundance of particular species using various methodologies, including aerial sightings, monitoring of particular herds or breeding pairs of mammalian species. Often monitoring activities are tied to species action plans for those species threatened with extinction
Policy relevance	Up to one in six of all European species of mammals are now threatened with extinction according to the most recent comprehensive review by the IUCN.
Limits/Uncertainty	Lack of time series data. In addition, it is notoriously difficult to establish the population sizes of some species of animals, and estimates made by wildlife biologists can have a very wide range of possible error.
Source	Adapted from EEA
Availability of data from international sources	Large Carnivore Initiative, Europe Large Herbivore Foundation

Domain	Institutional
Indicator	Number of protected areas out of total with a management plan
Definition/Type	The existence of management plans for individual designated areas.
Measurement unit	Number
Methodology	Collection of data from all relevant governmental organizations and units by a central unit, usually within the Ministry of Environment.
Policy relevance	Lands set aside for conservation but lacking management plans may fail over time to deliver the conservation benefits needed to meet legal objectives. Management planning is an imperfect but necessary instrument needed to meet conservation objectives in designated areas.
Limits/Uncertainty	Management plans alone are insufficient to produce desired results. Moreover, the simple existence of a management plan does not give any indications of its quality. The capacity to implement them also depends upon the commitment of financial resources and the availability of well trained personnel.
Source	Convention on Biological Diversity

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Availability of data from international sources	NA
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Domain	Institutional
Indicator	Expenditures on land and marine conservation per unit of designated area
Definition/Type	Amount of money spent on management of conservation lands over time, per unit of land area
Measurement unit	Euro per ha or km ²
Methodology	Division of all funds allocated for management of designated areas by total area of land under designated status
Policy relevance	Expenditures on conservation activities indicates both the commitment of states to meet biodiversity objectives as well as their capacity to do so. Capacity is built only slowly over time, and is comprised of more than financial commitments, but financial commitments form a part of the core of capacity building in this area.
Limits/Uncertainty	Management activities cover a wide variety of activities, not all of them directly beneficial to biodiversity conservation. Management activities can even include activities harmful to conservation, such as unsustainable timber harvesting and building recreational facilities that have a negative impact on wildlife. However, expenditures do provide a reliable indicator of a state's capacity to meet objectives set out in management plans for conservation lands.
Source	Adapted from the Convention on Biological Diversity
Availability of data from international sources	NA

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Annex 10 Indicators for Desertification

Domain	Agriculture
Indicator	Arable and Permanent Crop Land Area
Definition	Arable and permanent crop land is the total of “arable land” and “land under permanent crops”. Arable land is the land under temporary crops, temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (for less than five years); and land under permanent crops is the land cultivated with crops that occupy the land for long periods and need not be replanted after each harvest
Measurement unit	1000 ha.
Policy relevance	This indicator shows the amount of land available for agricultural production and, <i>inter alia</i> , the cropland area available for food production. The data when related to other variables such as population, total land area, gross cropped area, fertilizer use, pesticides use, etc., can also be used to study agricultural practices of the country. In order to be useful, it must be available as a time series. Changes in the indicator value over time or between various components may show increased or decreased pressure on agricultural land. This indicator is of value to land planning decision making.
Methodology	The indicator is connected to the use of land for agricultural activity and is historically based on point estimates derived from data collected in periodic agricultural censuses and surveys.
Limits/Uncertainty	This indicator does not reveal anything about increased productivity of agricultural land, or of the spatial variation in land quality.
Source	UNCSD.2001
Availability of data from international sources	FAO Statistical Databases. http://apps.fao.org/

Domain	Agriculture
Indicator	Use of fertilizers
Definition/Type	Extent of fertilizer use in agriculture per unit of agricultural land area.
Measurement unit	kg/ha.
Policy relevance	The purpose of this indicator is to measure the intensity of fertilizer use in agriculture (crop husbandry). Extensive fertilizer use is linked to eutrophication of water bodies, soil acidification, and potential of contamination of water supply with nitrates. The actual environmental effects will depend on pollution abatement practices, soil and plant types, and meteorological conditions.

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Methodology	Data on the quantities of fertilizers used are converted into the three basic nutrient components and aggregated. The three components are nitrogen (N), phosphorous (P205), and potassium (K20). Factors for chemical breakdown are standardized. Data on fertilizers are compiled from industry sources and non-traditional sources. Data for developing countries generally refer to domestic disappearance based on imported products.
Limits/Uncertainty	Environmental impacts caused by leaching and volatilization of fertilizer nutrients depend not only on the quantity applied, but also on the condition of the agro-ecosystem, cropping patterns, and on farm management practices. In addition, this indicator does not include organic fertilizer from manure and crop residues, or the application of fertilizers to grasslands. The indicator assumes even distribution of fertilizer on the land.
Source	UNCSD.2001
Availability of data from international sources	FAO Statistical Databases. http://apps.fao.org/ International Fertilizer Association. http://www.fertilizer.org/

Domain	Agriculture
Indicator	Use of Agricultural Pesticides
Definition	Use of pesticides per unit of agricultural land area.
Measurement unit	Pesticide use in metric tons of active ingredients per 10 km ² of agricultural land.
Policy relevance	The challenge for agriculture is to increase food production in a sustainable way. One important aspect of this challenge is the use of agricultural pesticides which add persistent organic chemicals to ecosystems. Pesticides can be persistent, mobile, and toxic in soil, water, and air; and can have impact on humans and wildlife through the food chain. They tend to accumulate in the soil and in biota, and residues may reach surface and groundwater through leaching.
Methodology	Data on pesticide use are usually derived from sales or “domestic disappearance” and expressed as active ingredients. Agricultural area data are widely available. Interpretation will benefit from information on types of active ingredients in use, seasonal doses, rate of application, and variability on use for different crops and regions.
Limits/Uncertainty	This indicator provides an aggregation, which ignores toxicity, mobility, and level of persistence; and spatial and application variances. It does not consider the use of pesticides outside of agriculture, which can be significant in developed countries. Data omissions and errors often occur during the transfer of the primary data to statistical authorities.
Source	UNCSD.2001

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Availability of data from international sources	Food and Agriculture Organization of the United Nations (FAO). http://www.fao.org/ Organization for Economic Co-operation and Development (OECD). http://www.oecd.org/ European Union Eurostat. http://europa.eu.int/comm/eurostat/ Landell-Mills. http://www.landell-mills.com/
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Domain	Forests
Indicator	Forest Area as a Percent of Land Area.
Definition/	The amount of natural and plantation forest area tracked over time.
Measurement unit	%
Policy relevance	Forests provide many significant resources and functions including wood products and non-wood products: recreational opportunities, habitat for wildlife, water and soil conservation, and a filter for pollutants. They support employment and traditional uses, and biodiversity. There is general concern over human impact on forest health, and the natural processes of forest growth and regeneration. Combating deforestation to maintain the production of wood and non-wood products and to preserve soils, water, air and biological diversity is explicitly considered in Agenda 21.
Methodology	The measurement methods for forest area can be contained in national forest inventories, and obtained by sampling ground surveys, cadastral surveys, remote sensing, or a combination of these. The forest area is calculated as the sum of plantations and natural forest areas with tree crown cover equal or more than ten percent.
Limits/Uncertainty	The area figure does not give any indication of the quality of the forest, its ecosystem context, nor forest values or practices. The indicator does not provide information on the degradation of the forest resources in a country. The total forest area in a country might remain unchanged, but the quality of the forest can become degraded.
Source	UNCSD.2001
Availability of data from international sources	International data provided by other institutions, for example World Resources Institute, are mostly based on the FAO Forest Resources Assessment information and data. http://www.wri.org/ FAO Statistical Databases. http://apps.fao.org The FAO Forestry Department Information Note on <i>Criteria and Indicators for Sustainable Forest Management</i> . http://www.fao.org/forestry/FODA/infonote/infont-e.stm The International Tropical Timber Organization (ITTO). http://www.itto.or.jp/ The United Nations Environment Programme (UNEP). http://www.unep.org/

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Domain	Forestry
Indicator	Wood Harvesting Intensity
Definition	The indicator compares the total forest fellings as a percentage of the net annual increment.
Measurement unit	%
Policy relevance	The indicator aims at assessing whether forests are being used within the limits of their actual productivity. If the ratio is smaller or equal to one, it means that the country is harvesting less, or equal, to the annual forest increment. This represents the <i>sustained yield principle</i> . If the ratio is more than one, a country is over-harvesting its wood, or other specific forest resource.
Methodology	The numerator is the total annual roundwood production. The denominator is the total annual productive forest increment. An adequate time series is required to show meaningful trends.
Limits/Uncertainty	Harvesting intensity gives us an indication of the degree of tree cover reduction at a given time, but does not refer to what will happen to the forest after it has been “intensely harvested”. This indicator should be interpreted over the longer term. In given cases, the annual roundwood production might exceed the forest increment for market reasons, age structure of forests, or other reasons for a few years without being an indication for unsustainable management.
Source	UNCSD, 2001
Availability of data from international sources	FAO Statistical Databases. http://apps.fao.org The International Tropical Timber Organization (ITTO). http://www.itto.or.jp/

Domain	Land degradation
Indicator	Land Affected by Desertification
Definition	This is a measure of the amount of land affected by desertification and its proportion of national territory.
Measurement unit	Area (Km ²) and % of land area affected
Policy relevance	The indicator should be a mechanism for determining the importance of this issue at the national level. Trend data over time can indicate success of response mechanisms. For dryland areas, desertification is a central problem in sustainable development. While many dryland ecosystems have generally low levels of absolute productivity, maintenance of that productivity is critical to the present and future livelihood of many hundreds of millions of people. Combating desertification is the core of sustainable development for large areas of the world. Severe degradation is a major impedent to sustainable development; moderate or slight degradation is also a significant barrier.
Methodology	Measurement for this indicator initially requires an assessment of the extent of land degradation throughout the

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arid, semi-arid, and dry sub-humid zones of the nation. This is best done by a combination of previous assessments represented in map form, carried out by the United Nations Environment Programme (UNEP) with the United Nations Office to Combat Desertification and Drought (UNSO), and the Food and Agricultural Organization (FAO); and updates from a combination of remote sensing and local knowledge.

The creation of an index that combines degrees of severity will require the following measures:

(i) Area subjected to severe land degradation $x\text{Km}^2$ (severe here includes both the severe and very severe categories of UNEP).

(ii) Area subjected to moderate land degradation $y\text{Km}^2$.

(iii) Area subjected to slight land degradation = $z\text{Km}^2$.

(iv) National area (excluding surface water bodies) $n\text{Km}^2$.

(v) National area of drylands (vulnerable to desertification, assuming that all drylands are potentially vulnerable to desertification. Hyper-arid lands are excluded), consisting of arid, semi-arid, and dry subhumid land = $d\text{Km}^2$.

From the above measurements, the following sets of numbers can be derived:

Indicator computations:

a. National area affected by desertification
 $= x + y + z\text{Km}^2$

b. Percent of national area affected by desertification
 $= \frac{x + y + z}{n} \times 100$

c. Percentages of national area affected by severe, moderate and slight desertification respectively can be calculated in the same way.

d. Percent of national drylands affected by desertification
 $= \frac{x + y + z}{d} \times 100$

e. National area not affected by desertification
 $= n - (x + y + z)\text{Km}^2$

f. National dryland area not affected by desertification
 $= d - (x + y + z)\text{Km}^2$

Trends can be determined by comparing results computed for a sequence of years (for example, every five years). A useful extension of the indicator would be for countries to report dryland areas (d) as a percentage of all agriculturally productive areas ($e=n$ -hyper arid land) to give an indication of the overall vulnerability of the country to desertification.

While it is based on a combination of analytical and subjective assessment, if these are done systematically on an

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	annual basis, a sound database can be developed. Given the importance of determining the extent and severity of desertification to the index, it may be that a periodic special survey using remote sensing and ground assessment may be important, though this may only be technically feasible for some countries.
Limits/Uncertainty	The ecosystems addressed in this definition undergo cyclic episodes of more or less rainfall, as well as long-term degradation in many cases. Separating short-term fluctuations from longer-term trends is important, though scientists often find this difficult to determine, except for longer time periods. Also, the United Nations Environment Programme (UNEP) has generally defined desertification (degradation) in categories (severe, moderate, slight), and a national indicator needs to include an assessment of this kind. It has been a practice to include problems of waterlogging and salinization as part of desertification, if they occur within the ecosystems as defined above. In this case, the area affected by these problems should also be included in the desertified area.
Source	UNCSD.2001
Availability of data from international sources	United Nations Convention to Combat Desertification. http://www.unccd.ch United Nations Development Programme's Office to Combat Desertification and Drought (UNSO). http://www.undp.org/seed/unsd.html

Domain	Land degradation
Indicator	Progress in management of contaminated sites
Definition/Type	The indicator shows progress in five main steps: preliminary study; preliminary investigation; main site investigation; implementation of risk reduction measures. The indicator also shows the costs to society of the clean-up, the main activities responsible for soil contamination and the achievements managing the contaminated sites.
Measurement unit	<ul style="list-style-type: none"> - Number of sites managed/to be managed at different management steps - Percentage of sites where risk reduction measures are completed and where need for remediation measures is estimated related to the estimated total number of sites to be identified by surveys - Expenditures are provided in million euro per capita per year and million euro per GDP - Contribution of economic activities to soil contamination is calculated in terms of percentage of sites where the activity is present over the total number of investigated sites - Percentage of sites per risk reduction measure undertaken by each country
Policy relevance	Legal requirements for the protection of water quality exist at national as well as at EU level whereas for soil no legal standards have been implemented at EU level so far. They only exist in some of the EU countries. In general legislation aims at preventing new contamination and at the same time is setting targets for the re-establishment of already exceeded environmental standards by means of remediation activities. In the future, implementation of the legislative and regulatory frameworks in place (Landfill Directive, Integrated

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	<p>Pollution Prevention and Control Directive, Water Framework Directive) should result in fewer inputs of contaminants into soil that might give rise to severe contamination and in a better control of contamination caused by natural or other events. As a consequence, most of the efforts will be focused on historical contamination.</p>
Methodology	<p>Progress in management of local soil contamination in Europe: the data source identifies the number of sites at each management/processing steps. Data is aggregated considering those countries that provide a complete record for all the management steps. The projection to year 2050 is done on the basis of the annual increase rate calculated for the period 2001-2006. This rate is multiplied by the number of years from 2006 to 2025 (linear trend assumed) and the result is added to the figure of 2006.</p> <p>Estimated allocation of public and private expenditures for site remediation. This information is directly provided by countries. The European figure is a weighted average based on those countries that provided data. The total annual management expenditure is used to weight the percentage of public and private expenditures in each country.</p> <p>Breakdown of local sources of soil contamination. Countries provide the data in terms of the percentage contributions of the specific sectors to the total number of sites. Percentages are weighted by the number of sites that have gone through site investigation in order to obtain European shares.</p> <p>Breakdown of industrial and commercial activities causing local soil contamination: the data are provided directly by countries in terms of the percentage contributions of the specific sectors to the total number of sites.</p> <p>Expenditures on remediation of contaminated sites: raw data (in EUR) are transformed in EUR per capita and as a percentage of Gross Domestic Product.</p> <p>Status of completed risk reduction measures. Percentage of remediated sites: $[\text{Number of remediated sites}] / [\text{Estimated number of potentially polluting activities sites}] * 100$. Percentage of sites where need for remediation measures is estimated: $[\text{Estimated number of contaminated sites}] / [\text{Estimated number of potentially polluting activities sites}] * 100$.</p> <p>Main contaminants affecting soil and groundwater. Contaminants are ranked taking into account the number of countries where the contaminant appears as first or second contaminant. Then a score is calculated: $[\text{Number of countries as first contaminant}] * 2 + [\text{Number of countries as 2nd contaminant}]$.</p>
Limits/Uncertainty	<p>The greater uncertainty is associated to estimates (e.g. estimated number of contaminated sites), usually based on expert judgement. This uncertainty increases with the projections to year 2025. In that case a linear trend has been assumed, representing probably the maximum that can be reached in that year.</p> <p>Not sufficiently clear methodology and data specifications may have induced countries to interpret data specifications in different ways and therefore have provided information which may not be fully comparable. This problem has been progressively solved as better specifications have been introduced in the questionnaire. As</p>

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	a result quality of data has been improving.
Source	EEA.2007
Availability of data from international sources	EEA, http://rod.eionet.europa.eu/show.jsv?id=33&aid=499&mode=A

Domain	Land degradation
Indicator	Exposure of ecosystems to acidification, eutrophication and ozone
Definition	The indicator shows the ecosystem or crops areas at risk of exposure to harmful effects of acidification, eutrophication and ozone as a consequence of air pollution, and shows the state of change in acidification, eutrophication and ozone levels of the European environment
Measurement unit	<ul style="list-style-type: none"> - Regions at risk: % of total ecosystem area - Critical loads/threshold, depositions, exceedance: acidifying equivalents (H+) per hectare per year (eq H+.ha-1.a-1) - Change over time: % of change compared to base year - Percentage of the arable land in Europe potentially exposed to ambient air concentrations of ozone (O3) in excess of the EU target value set for the protection of vegetation
Policy relevance	<p>Setting emissions ceilings and long-term targets for emission reductions of sulphur, NOx, VOCs and ammonia, by means of an effects-based approach - the critical load and critical levels concept - and a differentiation of emission reduction obligations, which aim at gradually attaining these critical loads and levels for each location.</p> <p>A combined ozone and acidification abatement strategy has been developed by the Commission, resulting in an Ozone Daughter Directive (2002/3/EC) and a National Emission Ceiling Directive (2001/81/EC). In this legislation, target values for ozone levels and for precursor emissions have been set. This long-term objective is largely consistent with the long-term critical level of ozone for crops as defined in the UN-ECE CLRTAP protocols to abate acidification, eutrophication and ground level ozone.</p>
Methodology	<p>Air emission data is reported annually by national authorities to UNECE/EMEP and to EU. Reported data includes both newest estimates (two years in arrears) and updates of emissions from previous years. Emission data is stored and verified at EMEP/MSC-W.</p> <p>Using these emissions, EMEP/MSC-W calculates atmospheric transport of sulphur and nitrogen pollutants using the EMEP Unified Model at a spatial resolution of 50km and according to modelled meteorological conditions adjusted towards observations.</p> <p>The Co-ordination Centre for Effects uses the resulting deposition estimates to calculate exceedances over</p>

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	reported critical loads for acidity and nutrient nitrogen. In 2004 the CCE updated this database with national updates of critical loads (see section on gap filling where countries did not provide data). These updated estimates have been used for the calculations for 1980, 2000, 2010, and 2020
Limits/Uncertainty	<p><u>Acidification and eutrophication</u></p> <p>The estimate of the deposition of acidifying and eutrophying pollutants is a calculation directly dependent on reported emissions. Monitored depositions are not employed for any other reasons than comparison against the EMEP model. Thus, the exceedance of deposition over critical loads presented in this indicator is itself a calculation derived from reported air emissions. As negotiation of emission reduction agreements has been based on similar model calculations, reporting of emission reductions in accordance with those agreements would be expected to indicate the improvement in environmental quality required by policy objectives. Model estimates of pollutant depositions are used rather than observed depositions on account of their higher spatial resolution.</p> <p><u>Ozone</u></p> <p>The air quality data is officially submitted. It is assumed that the AQ data has been validated by the national data supplier. Methodology uncertainty is given by uncertainty in mapping AOT40 based on interpolation of point measurements at background stations. Station characteristics and representativeness is often insufficiently documented which may implies that stations have been included which are not representative for background conditions</p>
Source	EEA.2007
Availability of data from international sources	<p>European air quality database (European Environment Agency)</p> <p>Corine land cover (CLC1990) 250 m - version 9/2007(European Environment Agency)</p> <p>Critical loads database and average accumulated exceedances (Coordination Center for Effects)</p> <p>Modelled deposition estimates for sulphur and nitrogen from the EMEP Unified Model on the standard EMEP grid resolution of approx 50km x 50km (The United Nations Economic Commission for Europe (Environment and Human Settlements Division)</p>

Domain	Urbanization
Indicator	Area of Urban Formal and Informal Settlements
Definition	Urban residential area in square kilometers occupied by formal and informal settlements
Measurement unit	km ²
Policy relevance	The indicator measures the sizes of both formal and informal settlements. By focusing on the legality of human settlements, this indicator measures the marginality of human living conditions.

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Methodology	Area of formal and informal settlements can be evaluated through aerial photography or land use maps. Informal settlements should not cover dwelling units which have been regularized, that is those units for which land titles, leases or occupancy permits have been granted. They should only include those units which presently occupy land illegally and/or housing units which are not in compliance with current regulation. Where feasible, the interpretation and meaning of this indicator would be supported by the comparison of formal and informal settlement areas to total urban area.
Limits/Uncertainty	The ephemeral nature and lack of an acceptable operational definition for this indicator, limit its usefulness, especially for trend analysis. The legal framework for settlements on which this indicator is based varies from country to country. Informal housing is not registered in official statistics, any measure of informal settlements remains limited. Information may be obtained from specific research studies, but it difficult to obtain and may be of variable quality. Homelessness, which is one of the extreme symptoms of human settlements inadequacy, is not accounted for by this indicator and in fact the existence of illegal settlements may reduce the incidence of homelessness. This indicator does not cover informal settlements in rural areas.
Source	UNCSD. 2001
Availability of data from international sources	UNCHS (Habitat) home page: http://www.urbanobservatory.org/indicators/database

Domain	Land use change and status
Indicator	Satellite derived vegetation index
Definition	A Normalized Difference Vegetation Index (NDVI) of green leaf biomass derived from National Oceanic and Atmospheric Administration's (NOAA) Advanced Very High Resolution Radiance (AVHRR) satellites
Measurement unit	Grid cells of 50 km ²
Policy relevance	This indicator measures the evolution of vegetation activity as a result of the combined effect of meteorological and ecological conditions, and human activity in dryland areas
Methodology	The NDVI is calculated using a ratio of the radiometric value obtained respectively from the near infra red (NIR) and visible red (R) channels of low resolution satellite data. It is represented by the formula: $NDVI = \frac{NIR - R}{NIR + R}$ ----- NIR+R It is computed every ten days from a series of daily NDVI values at a resolution of 7.6 km at the global level, and at 1 km for some subregions or countries.
Limits/Uncertainty	The following limitations are associated with this indicator: (i) calibration is needed to connect atmospheric

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	disturbance and variation of sensor sensitivity; (ii) correlation between NDVI and biomass remains coarse if not correlated with vegetation maps and/or ground measurements; (iii) problems exist in distinguishing very low vegetative cover from soil background.
Source	CSD.2007 and TEPI.Eurostat.1999
Availability of data from international sources	Data at the global scale is available from NASA/NOAA or the Système Probatoire d'Observation de la Terre (SPOT)

Domain	Land use change (change from natural to built-up area)
Indicator	Land use change
Definition	The amount of land per year per capita that is converted from “natural” to built-up area
Measurement unit	Km ²
Policy relevance	Land conversion due to urbanisation is a major cause of loss of natural habitats and biodiversity and the disruption of watersheds. The purpose of this indicator is to monitor the trends in land use change and determine the pressure of urban development patterns. Land conversion from natural to built-up area is a major source of impact associated with urbanisation. The increase in land conversion is a relevant indicator of increase in loss of open and green space and impervious surface.
Methodology	Statistics on land use change are made available by the FAO and by Eurostat. In addition CORINE land cover provides information for selected European regions.
Limits/Uncertainty	The indicator is difficult to measure due to the problem of various definitions of urban areas and the different land use classification systems across countries
Source	CSD.2007 and TEPI. Eurostat. 1999
Availability of data from international sources	FAO, Eurostat

Annex 11 GRDP's model for greening projects
Attached separately