The Thematic Evaluation on the Contribution of the Structural Funds to Sustainable Development

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Volume 2: Concepts and Methods

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TABLE OF CONTENTS

GHK

GHK

GHK

EXECUTIVE SUMMARY

THE ANALYTICAL FRAMEWORK FOR THE PROJECT

Purpose of the Analytical Framework

This report describes the analytical framework that has been developed to evaluate the contribution of the Structural Funds (SF) to sustainable development (SD). The framework includes methods to examine ways of improving programme management so that the future contribution of the SF to promoting sustainable development is greater.

An Operational Definition of Sustainable Development

The framework takes as its starting point the idea that SD can be defined by reference to changes in the stock of four different forms of capital: manufactured (or human-made), human (individual skills and resources), social (relating to norms and social relationships), and natural (or environmental). SD requires that the sum of these four capitals, per capita, should not decline over time. However, it is possible that decline in one form of capital can be compensated for by an increase in another, such that total capital stock per capita is maintained. The maintenance of SD through substitution is acceptable as long as the loss of capital does not represent a critical threshold beyond which the level of the capital stock is deemed to be unacceptable (because of costs or social norms). These thresholds are typically defined for natural capital, by reference to environmental standards. Thresholds can be envisaged, but are difficult to define for the other forms of capital.

The contribution of the SF is evaluated by reference to its influence on trends in the four forms of capital and especially on the emergence of trade-offs where a decline (or increase) in one capital is linked to an increase (or decline) in another. The contribution of the SF to SD in the case of trade-offs depends on the weight attached to the different forms of capital. These weights are reflected in the policy choices and objectives agreed through the political process. Reference to these choices therefore informs the evaluation.

The Analytical Framework

The framework is designed to operate primarily at regional, but also Member State (MS), level, and at the EU level. The framework comprises three components:

- The management framework for SF programmes, detailing the various actors and the points at which decisions can be influenced in order to improve programme management

- The set of tools and methods to be employed at different regional, national and EU levels, including indicators and econometric modelling, but also assessment methods and questionnaires

- The evaluation framework to be employed by evaluators at the regional or national levels to evaluate the SF contribution. The framework incorporates the indicators of SD structured by reference to the four capitals model and the assessment methods and questionnaire. Guidance for evaluators is incorporated into the framework.

Regional and National Evaluation

The evaluation framework comprises three parts:

- Part A: Regional Level Assessment

- Part B: Programme Level Assessment

- Part C: Programme Management .Assessment

The first two parts provide the assessment at the regional (and national) level of the contribution of SF to SD, while the third part assesses process issues relating to programme management. The basic framework for the assessment in Parts A and B is the impact matrix, which relates the measures in the SF programmes, and large projects, to trends in the four capitals and trade-offs specific to the region.

Part A provides the assessment criteria and the list of relevant SF measures and projects. The assessment criteria are defined by reference to actual trends measured, at least in part, by a set of base indicators prepared for the project, and by reference to the SD objectives of regional or national authorities.

Part B assesses each cell of the matrix to provide an appreciation of the contribution of the SF to SD. Aggregation by all specified SD trends and SF measures/projects, (if possible) provides the overall assessment. Note that the aggregation process has to be undertaken qualitatively, but can be supported by reference to the budget allocation by measures. This part includes consideration of other policy influences on the capitals as the basis for judging the relative contribution of the SF.

The third part (Part C) provides a detailed questionnaire, designed by reference to the programme management system, to identify how the programme is managed with respect to SD, and how the management might be improved. Particular emphasis is placed on the processes that lead to the generation and selection of projects for SF funding (the project pipeline).

Some 20 regional and national case studies have been conducted to test and to develop the evaluation framework and to evaluate the contribution of the SF to SD.

EU and National Evaluation

The regional case studies provide the basis for a synthesis of how the SF contribute to SD and how programme management has influenced the contributions identified. It will also provide the basis for identifying good practice in programme management and the lessons for developing project pipelines that support SD.

The EU level evaluation provides a complementary analysis of SF funds in terms of their contribution to SD, using an econometric model. This model is used to calculate an estimate of changes over time in capital stocks, using specific indicators of the different forms of capital, attributable to the use of the SF Programmes. Given the limited extent that econometric models can capture the range of variables that make up total capital, especially of social, but also natural, capital, the estimates are only a partial measure of the SF contribution. However, the approach does have the advantage of providing a clear 'counterfactual' analysis, of selected trends in the absence of the SF programmes. Comparison of the 'with SF' and 'without SF' situations provides some insight, at the EU and national levels, of the contribution of SF to SD.

Key Methodological Issues

The methodological approaches to the evaluation at regional (and national) level have addressed a number of key issues. We summarise the approaches below.

- Region (context) specific analysis – the approach explicitly recognised the need to allow regional case studies to specify the specific features of SD, and of SF programmes that were of regional significance. This inhibits direct comparison between regions, but this is not the principle reason for the cases.

- Trend analysis of selected criteria – the evaluators identified specific criteria considered regionally important for SD. To the extent possible within the case studies, this selection has been validated with regional stakeholders.

- Non-weighting of assessment criteria (but reference to implicit weighting as observed) – the approach to weighting was to effectively to provide equal weight to each criterion, unless there was evidence or a willingness of stakeholders to attribute weights.

- Non-aggregation of specific contributions – the aggregation of contributions across criteria has not been undertaken because of the difficulties in comparing different types of contribution. The approach places particular weight on the appraisal of individual contributions against specific criteria. This detailed analysis also provides a more informed basis for policy responses. To the extent that weak sustainability has been identified, aggregation of negative and positive impacts is possible on the basis of case study evidence of the political willingness of regional stakeholders to accept acknowledged trade-offs

- Examination of policy synergy and of non-SF activities – the contribution of SF has to take account of other non-SF policies. This is especially important in Objective 2 regions, where the SF is a only a modest element of regional policy. The approach has been to examine the interplay between the SF and non-SF policies in relation to selected measures or projects.

- Counterfactual judgements as to contribution of interventions compared to no SF – the added value of regional programmes that benefit from SF has been examined by a necessarily speculative examination of the selected measures and projects. Arguments in support of conclusions have been developed.

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1   INTRODUCTION

1.1   Aim of the Study

The aim of the study has been to understand the contribution that the EU Structural Funds (SF) have made to sustainable development (SD). More generally the study has aimed to improve the appreciation of how better to integrate sustainable development and regional policy objectives, and the consequent implications for the design and delivery of Objective 1, 2 and 3 Programmes and selected Community Initiatives, funded by the (SF). Sustainable development is already a horizontal priority for SF programmes but there is a desire to improve the contribution of SF to the achievement of SD objectives, partly by improving an understanding of the regional context within which Programmes are delivered. The concept of SD for the purposes of this project is based on the four capitals model, as proposed by the Terms of Reference. Annex 1 provides an introduction to this concept.

The outputs and deliverables of the project are intended to support the various stakeholders (EC desk officers, national, regional and local government officers, managing authorities, programme monitoring committees) to improve the contributions that Objective 1, 2 and 3 Programmes, the Cohesion Fund, and Community Initiatives can make to SD. This support comprises the development of concepts, methods and tools in this study, and their translation into practical guidance in non-technical language.

The points at which guidance might be provided, in the process of SF Programme design and delivery, are suggested in Annex 2. The Terms of Reference emphasise the importance of the project pipeline (i.e. the process through which projects are defined, designed and brought forward for funding) in this process.

Figure 1.1 provides an overview of the general purpose and design of the study.

1.2   Objectives of the Study

The evaluation has the following specific objectives (as specified in the terms of reference):

- To develop methods, indicators and approaches for the evaluation of regional SD;

- To identify ways throughout the delivery systems for SF to generate better projects promoting SD;

- To identify the main policy trade-offs being made in regional development policies either explicitly or implicitly.

The resulting evaluation will be used:

- To provide tools and methodologies which can assist regions, Member States and the EU in assessing the sustainability of their development plans;

- To enhance the sustainability of the SF programmes in the 2000-2006 period, for example in the context of the mid-term programme reviews;

- In the preparation of SF policies beyond 2006

FIGURE 1.1: GENERAL PURPOSE AND DESIGN OF THE STUDY

SF PROGRAMME DESIGN, MANAGEMENT & IMPLEMENTATION CYCLE

- Responsible Authorities

- EC
- Member State
- Managing Authority
- Monitoring Committee
- Programme Partnerships

GUIDANCE AND RECOMMENDATIONS

- Key Fields and Lessons

- Resource Allocation Decisions
- Institutional Arrangements
- Appraisal Processes
- Monitoring & Evaluation Processes
- Management Arrangements

SF PROGRAMME DESIGN, MANAGEMENT & IMPLEMENTATION CYCLE

– Specified Responsibilities

- EC (for EU Council & MS/Regions)
  - Allocation of Funding to SF (and other Programmes)
  - SF / CF Split
  - Agree Programme
  - Ex-post Evaluation (in cooperation with MS and Managing Authority)
- Member State in most cases, in discussion with the Region
  - Develop RDP
  - Develop CSF (Obj 1) or SPD or CIP
  - Draft Programme & Programme Complement
  - Establish Institutional Structures
- Managing Authority
  - Ex-Ante Evaluation (or MS in some countries)
  - Adopt Programme Complement
  - Identification of Project Proposals
  - Specification of Selection & Appraisal Criteria
  - Project Appraisal & Selection Process
  - Mid-Term Review (in cooperation with EC and MS)
  - Drawing up Annual and Final programme reports for the Commission
- Monitoring Committee
  - Approval of Project Selection & Appraisal Criteria
  - Approval of the Annual and Final Programme reports for the EC
  - Programme Evaluation
- Programme Partnerships
  - Project Implementation

EVALUATION OF PROCESSES & DECISIONS

- Programme Impacts and Scope for Management Improvement

- Regional Level Assessment
  - Base Indicators
  - Comparator Regions
  - National & Regional SD Indicators
  - Programme Data (SD Criteria, contextual indicators, SWOT)
  - Assessment Criteria
- Programme Level Assessment
  - External relevance
  - Internal consistency ('own' SD criteria)
  - Expenditure allocation
  - Impact on SD Assessment Criteria (incl. Counterfactual)
- EU Level Assessment
  - Synthesis
  - Economic Modelling
  - Counterfactual
- Programme Management Assessment
  - Design
  - Management Structures
  - Project Pipeline and Selection
  - Monitoring and Evaluation

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1.3   The Purpose of this Report

This synthesis report provides a description of the analytical framework developed for the study. It sets out the general purpose of the framework (Section 1), the main components of the framework (Section 2), the evaluation methods and protocols (Section 3), the evaluation tools relating to indicators (Section 4) and economic modelling (Section 5). Key methodological issues arising from the framework are summarised in the concluding section (section 6).

1.4   The Purpose of the Framework

The analytical framework has been developed to guide the evaluation of the contribution of the structural funds to sustainable development. The framework provides a common approach to the evaluation and seeks to translate the idea of sustainable development into a form that enables evaluation to take place. More specifically it seeks to translate the '4-capitals model' (Annex 1) as the basis for the evaluation.

1.5   Use of the Framework

The analytical framework has evolved during the testing phase, involving some 20 case studies of Member States and regions. The initial framework used in the case studies was prepared as written guidance for experienced evaluators of Structural Fund Programmes. This is presented as Volume 3. In many respects the use of this framework has been shown to be an acceptable way of approaching the evaluation objectives. However, there are some changes, mainly of simplification and focus, to take account of the experience in the testing phase, and to improve its utility for less experienced evaluators. The revised framework is presented in this Volume (with any key changes highlighted).

2 DEFINITION AND MEASUREMENT OF SUSTAINABLE DEVELOPMENT

2.1 An Operational Definition of Sustainable Development

Sustainable development is variously defined as either meeting human needs or increasing quality of life, both now and in the future. The Brundtland Report defined SD as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." At its simplest it means "development that lasts". That is, a path along which the maximisation of human well-being for today's generations does not lead to declines in future well-being.

Meeting human needs and increasing quality of life may be regarded as the 'development' part of sustainable development. Being able to maintain this into the future may be regarded as the 'sustainability' part. Meeting human needs and increasing quality of life may be regarded as increasing human welfare or well-being (through consumption, satisfying work, good health, rewarding personal relationships and well functioning social institutions, and the full range of environmental goods and services). Doing so sustainably requires that the capital stocks, from which the benefits of human needs satisfaction and increased quality of life derive, are maintained or increased over time. Development is considered to be sustainable if and only if the stock of capital (wealth) remains constant or rises over time.

For the purposes of this study, the operational definition of sustainable development is t**he provision of services and benefits that increase human well-being without causing a decline in capital stocks per capita**. Capital stocks (assets) provide a flow of goods and services, which contribute to human well-being. Types of capital that sustain well-being – because of their levels and distribution – include man-made, natural, human and social capital. Box 1.1 elaborates the four kinds of capital.

Other types of capital have been put forward, principally among them financial capital. However, financial capital, and the financial system through which it acts, may better be seen as a type of social capital, a conventional way of allocating and representing the power to mobilise the other four kinds of capital which have the real inherent power to deliver benefits. This is an important point because the SFs which are the subject of this evaluation are themselves financial capital, and in fact this clarifies the essential nature of this type of capital as social capital. These Funds are the product of a political process which has determined their allocation to certain regions of the European Union in order to achieve certain social and economic objectives. They represent the power to mobilise and create other kinds of capital rather than embodying real productive power themselves. The evaluation seeks to determine the extent to which they have been successful in the exercise of this power, and to recommend guidelines and procedures for their deployment in the future. These guidelines and procedures will themselves be further examples of social capital, if their effect is to enable the SFs more effectively to achieve their objectives.

Box 1.1: Types of Capital

Four kinds of capital have been identified:

Manufactured Capital

Manufactured (or human-made) capital is what we traditionally consider as capital: produced assets that are used to produce other goods and services. Some examples are machines, tools, buildings, and infrastructure.

> Natural Capital
>
> In addition to traditional natural resources, such as timber, water, and energy and mineral reserves, natural capital includes natural assets that are not easily valued monetarily, such as biodiversity, endangered species, and the ecosystems which perform ecological services (e.g. air and water filtration). Natural capital can be considered as the components of nature that can be linked directly or indirectly with human welfare.
>
> Human Capital
>
> Human capital generally refers to the health, well-being, and productivity potential of individual people. Types of human capital include mental and physical health, education, motivation and work skills. These elements not only contribute to a happy, healthy society, but also improve the opportunities for economic development through a productive workforce.
>
> Social Capital
>
> Social capital, like human capital, is related to human well-being, but on a societal rather than individual level. It consists of the social networks that support an efficient, cohesive society, and facilitate social and intellectual interactions among its members. Social capital refers to those stocks of social trust, norms and networks that people can draw upon to solve common problems and create social cohesion. Examples of social capital include neighbourhood associations, civic organisations, and co-operatives. The political and legal structures which promote political stability, democracy, government efficiency, and social justice (all of which are good for productivity as well as being desirable in themselves) are also part of social capital.

Meeting human needs and increasing quality of life may be regarded as increasing human welfare or utility (through consumption, satisfying work, good health, rewarding personal relationships and well functioning social institutions, and the full range of environmental goods and services). Doing so sustainably requires that the capital stocks from which the benefits of human needs satisfaction and increased quality of life derive are maintained or increased over time.

This immediately raises the question as to whether it is the total stock of capital that must be maintained, with substitution allowed between various parts of it, or whether certain components of capital are non-substitutable, i.e. they contribute to welfare in a unique way that cannot be replicated by another capital component. With regard to natural capital, Turner (1993, pp.9-15) identifies four different kinds of sustainability, ranging from very weak, which assumes complete substitutability, to very strong, which assumes no substitutability so that all natural capital must be conserved. The assumption of the former is implicit in the so-called 'Hartwick rule' (Hartwick 1977), namely that, provided that the resource rents from the exploitation of exhaustible resources are invested in manufactured capital, per capita consumption can remain constant indefinitely over time. Very strong sustainability has been called "absurdly strong sustainability" (Daly 1995, p.49) in order to dismiss it from practical consideration. Turner's more interesting intermediate categories are:

- Weak environmental sustainability, which derives from a perception that welfare is not normally dependent on a specific form of capital and can be maintained by substituting manufactured for natural capital, though with exceptions.

- Strong environmental sustainability, which derives from a different perception that substitutability of manufactured for natural capital is seriously limited by such environmental characteristics as irreversibility, uncertainty and the existence of 'critical' components of natural capital, which make a unique contribution to welfare. An even greater importance is placed on natural capital by those who regard it in many instances as a complement to man-made capital (Daly 1992, pp.27ff.).

The point at issue is that substitution of one form of capital for another has the potential to lead to an overall decline in total capital, and hence unsustainable development. The potential for unsustainable development lies in the trade-offs made between different forms of capital, and the degree to which:

- Any decline represents a breach of some critical threshold, and if not whether

- Any decline in one form is compensated by increases in other forms.

The existence and nature of trade-offs needs to be understood empirically, not withstanding the fact that the determination of unsustainable development is essentially normative in terms of the extent of compensation and the existence of critical thresholds.

2.2 Principles of Sustainability

As noted above, sustainable development entails meeting human needs and increasing quality of life now and in the future. The process is often regarded as having economic, social and environmental dimensions, which can again be easily related to Figure 1 in Annex 1, which shows quality of life being generated directly by natural (also often called environmental) and social capital, as well as through the economic process of production. If there are concerns that current modes of development (meeting human needs and increasing quality of life) are unsustainable, it is interesting to consider whether these concerns largely have an economic, social or environmental basis (or some mixture of the three). Further, are there principles or criteria of sustainability which could be applied across these dimensions to facilitate judgements as to whether development is sustainable or not, i.e. whether there critical thresholds that can be defined in addition to those already reflected in environmental standards.

With regard to the economic dimension, economists have long had guidelines as to whether economic growth and development should be regarded as sustainable. The rate of inflation, public sector net credit requirement, and balance of payments, among others, are all considered to be important indicators of economic sustainability. The sustainable development idea has brought little new to this particular sustainability dimension.

In contrast, the idea of social sustainability is both far less developed and seems much more intractable. Doubtless it is true that social sustainability is affected by such conditions as poverty, inequality, unemployment, social exclusion and the corruption of breakdown of social institutions. But the relationship between sustainability and these conditions is clearly very complex and quite different as between different societies. It seems unlikely that a social sustainability threshold for unemployment or inequality, comparable for example to the target rate of inflation for economic sustainability, will be identified. What seems more important in this case is to ensure that the direction of change is towards what is considered necessary for sustainability, rather than the attainment of some particular number (e.g. full employment). This evaluation seeks to generate insights about the direction of change in social capital and the contribution of the SF to these trends. However, the evaluation will not do so in relation to targets or thresholds of social sustainability.

The environmental dimension of sustainability is different from both the economic and social dimensions, in that it is possible to articulate principles of sustainability based on scientific evidence, and thence to derive thresholds and standards for environmental sustainability, according to which it is possible to distinguish between sustainable and unsustainable use of the environment and the functions which it performs for people. An important part of the evaluation of the contribution of the SFs will be to determine

whether and to what extent they have contributed to trends in relation to environmental sustainability thresholds and standards.

2.3 Additional Evaluation Questions

Other questions raised by the use of a '4-capitals' model and considered by the evaluation include:

- how to measure each kind of capital?

- how to define whether a particular form of capital is increasing or decreasing?

- how to define an "exchange rate" between different forms of capital as the basis of specifying the scale of compensation?

More generally, the approach raises three fundamental issues for assessing SD, which the evaluation has to consider;

- the possibility of specifying the most socially desirable combination of the different types of capital in the total stock of capital, i.e. the stock that maximises social welfare now and in the future

- the possibility of specifying critical or minimum thresholds of each type of capital below which substitution is unacceptable; and

- the possibility of specifying spatial and temporal boundaries within which measurement is defined.

2.4 Approaches to Measuring Sustainable Development

Historically, economic development has sought to maximise monetary capital, while ignoring non-monetary assets, such as human health and well-being, social networks, clean air and water, and biological diversity. As a result, economic development has often occurred to the detriment of human and natural resources, which are clearly valuable to human society, but are usually not included in economic accounting systems. As discussed above in order to achieve SD, the traditional definition of capital must be expanded to include natural and social, as well as economic resources.

Much recent work on measuring progress towards SD has addressed specific issues, such as measuring climate change or the environmental and social impacts of particular sectors (e.g. agriculture, energy and transport). Measuring SD at an aggregate level however, requires a broad integration of indicators of economic, environmental, and social changes. One way to achieve this integration is to extend the traditional framework used for measuring economic activity – the National Accounts. These extensions could record changes in environmental assets, and highlight environment-related transactions (e.g. pollution abatement and control expenditure). Such extensions in the social area could allow the linking of accounts measuring employment, human capital, and the distribution of household income and consumption among socio-economic groups.

Measuring natural and human capital requires both monetary and physical data. While work in these fields has progressed, the application of a fully extended National Accounts framework remains a medium to long term objective. In the short term, complementary approaches to achieve such integration are required.

Since indicators in each of the three dimensions (social, economic and environmental) of SD have been developed, one approach to the problem of measurement is to select a small number of indicators pertaining to each of these dimensions to capture key SD trends.

The OECD has been developing a set of indicators based on the capital/income model which provides a useful starting point. These are grouped as resource indicators (measuring levels and changes in economic, environmental and social assets) and outcome indicators (covering the quantity and quality of development across a broad range including: income distribution, health and environmental quality).

A small number of indicators can be used to complement single measures based on the aggregation of indicator scores. Some aggregate indicators use physical or subjective weights to combine trends in different variables (e.g. the Living Planet Index by, WWF et al.) Other aggregate indicators rely on monetary valuation of different assets and flows, and are closely linked to the national accounting framework. Examples of the latter include measures of "green GDP" and "genuine savings". Genuine savings deduct from the traditional definition of savings the estimated costs of depletion and degradation of a range of environmental assets, and add on estimates of investment in human capital. One advantage of the genuine savings approach is that persistently negative values can be interpreted as evidence of unsustainable trends. However, this approach suffers from the difficulty of attaching monetary value to the depletion and degradation of a range of resources.

2.5 Aggregations of Indicators for Sustainable Development

An advantage of the framework approach to indicators of sustainable development is that each of the many aspects of sustainable development can be specifically reported on in its own terms, and trends for the separate aspects can be identified. However, a disadvantage is that, without combining the indicators in some way, it is not possible to draw any overall conclusions about progress towards sustainable development unless all the indicators happen to be moving in the same direction in relation to that progress. This is most unlikely to be the case.

A number of methods have been developed for the aggregation of indicators so that overall impacts can be assessed:

- Aggregation into environmental themes. This has been the approach underlying the Netherlands National Environmental Policy Plan process. It is described in Adriaanse 1993.

- Aggregation across environmental themes. One method of doing this is to weight the different themes according to perceptions of environmental performance. An example of this method is the Ecopoints system developed by BRE (see BRE 2002). Another method depends on the setting of sustainability standards for the themes, and then aggregating them according to the distance from the standard. An example of this approach based on the concept of the 'sustainability gap' is given below.

- Aggregating across environmental and other themes by using multi-criteria analysis, or relating them to some concept such as Quality of Life or Human Development. The United Nations Development Programme's Human Development Index (UNDP annual) is an example of this approach.

An innovative application of this method has been made by the Consultative Group on Sustainable Development Indicators (CGSDI 2002), which was established in 1996 and is an internet-based working group drawing members from many different institutions and countries. Their Dashboard of Sustainability is not a specific selection of indicators as such, but a way of presenting sustainability indicators in an aggregated form, with the aim of providing an informative and easily grasped and communicated overview of the complex relationships between the social, environmental and economic dimensions sustainable development issues. Indicators from the three sustainability dimensions form the basis for aggregated social, environmental and economic indices, which then are further aggregated into one 'policy performance index' and presented as a pie chart organised in three concentric circles. The outer circle contains the actual indicators, the next level circle contains the three sub-indices, and the inner circle contains the overall policy performance index. Clearly, the index is only as good as the indicators used for it, and the proponents of this methodology stress the continued need for improved and broadened indicators. However, the methodology is being used, at the local and regional as well as the national level.

Expressing the different effects in monetary form and adding them up according to some theoretical position. Some calculations are based on economic welfare theory (see Nordhaus & Tobin 1972 for an early example), and these have been developed into proposals for the calculation of a Green GDP (see Ekins 2001 for a discussion of this). The Index of Sustainable Economic Welfare (ISEW) (first proposed by Daly & Cobb 1989) starts from consumer expenditure and then adds various social or environmental impacts (which can be positive or negative) to arrive at a supposedly more realistic assessment of changes in human welfare than that represented by changes in GDP (see ISEW 2002 for current thinking on ISEW). The indicator has been further developed into the Genuine Progress indicator (see GPI 2002). All the methods based on giving monetary values to different impacts essentially take the weak sustainability approach in the terms discussed earlier, assuming that the different aspects of sustainable development, and the different forms of welfare associated with them, are commensurable and can therefore be expressed in the same numeraire. As was noted earlier, the implementation of this assumption does not permit any subsequent attempt to assess whether it was justified, except in terms of the plausibility of the results and conclusions to which it leads.

The situation is well-illustrated by the World Bank's Genuine Savings indicator (World Bank 2000), which is one of the best known of the methods that has sought to express different aspects of sustainable development in money terms. The indicator is explicitly based on a capitals methodology such as that described above. It is computed from the figure for net domestic savings (assumed to comprise net additions to, or investment in, physical capital), plus education expenditures (assumed to comprise net additions to, or investment in, human capital) minus depletion of energy, mineral and forest resources, and damages from CO_2 emissions (assumed to comprise net loss of natural capital). All the loss of natural capital has been computed in money terms, to enable the relevant calculation to be made. In addition to assuming weak sustainability, such an approach assumes that all education expenditures are converted into productive human capital, which may not be the case, and covers only a relatively small range of environmental issues compared to those assessed in frameworks of environmental indicators such as those shown in Table 5.1. Moreover, no attempt has yet been made to incorporate in this indicator changes in social capital.

It may also be noted that according to the calculations of Genuine Savings that have so far been made (World Bank 2000, Table A1, p.10), all OECD countries and the

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great majority of developing countries have positive Genuine Savings. If the indicator truly is 'a sustainability indicator', as the paper appears to claim (p.2), this would seem to indicate that most countries, and all OECD countries, are sustainable. If this is true, then the issue of sustainability is much less important that often seems to be supposed in policy making (it is not clear, for example, why the EU needs a 'sustainable development strategy', if all EU countries are already sustainable, as the Genuine Savings indicator appears to suggest). This appears to put in question either the weak sustainability assumption on which the indicator is based, or the methodology by which it has been computed. Unfortunately the indicator itself cannot help to address these questions.

It therefore seems desirable to go beyond the Genuine Savings indicator and assess sustainability separately across the different capitals to see whether the broad sustainability conclusion of the Genuine Saving indicator is revealed as justified. The next section describes such an approach in respect of environmental sustainability.

2.6   The Structural Funds and Sustainable Development

While differing definitions of sustainable development abound, it is now generally recognized to comprise a process of change in society which generates social and economic benefits while protecting the environment and making sustainable use of environmental resources. Any evaluation relating to sustainable development will therefore need to include environmental and resource indicators as well as those of socio-economic development.

The ECOTEC environmental evaluation of the SFs noted that "their main objective is to help create employment and generate economic development" (ECOTEC 1999, p.iii). The dilemma for sustainable development is that, as long as the SFs generate a typical path of economic development "the greater the success in stimulating economic growth and employment, the greater the increase in production and consumption and the greater the use of environmental resources and the amounts of waste, by-products and emissions produced" (ECOTEC 1999, p.2). In other words the impacts of the SF programmes would be likely to meet economic and development needs which were their primary focus, but might include negative environmental effects which were not consistent with the European Union's new horizontal objective of sustainable development.

Resolving this dilemma and moving towards sustainable development will require "a significant shift and change to new patterns of development, production, consumption and behaviour" (ECOTEC 1999, p.2), in which increased incomes and employment are accompanied by reductions in environmental impacts and resource use, rather than their increase. This implies a very different path of development to that which has hitherto characterized industrial economies, and one which is far more eco-efficient, where this term denotes the ability of an economy to generate ever-increasing amounts of value from a constant or reducing level of resources and with ever-declining environmental impacts.

The SFs are a relatively small part of any country or region's overall economic activity, and cannot be expected to strike out on a sustainable development path all by themselves. But the SFs are of a sufficient size to be able in some contexts either to reinforce the old unsustainable development path, or to contribute to a shift towards sustainability.
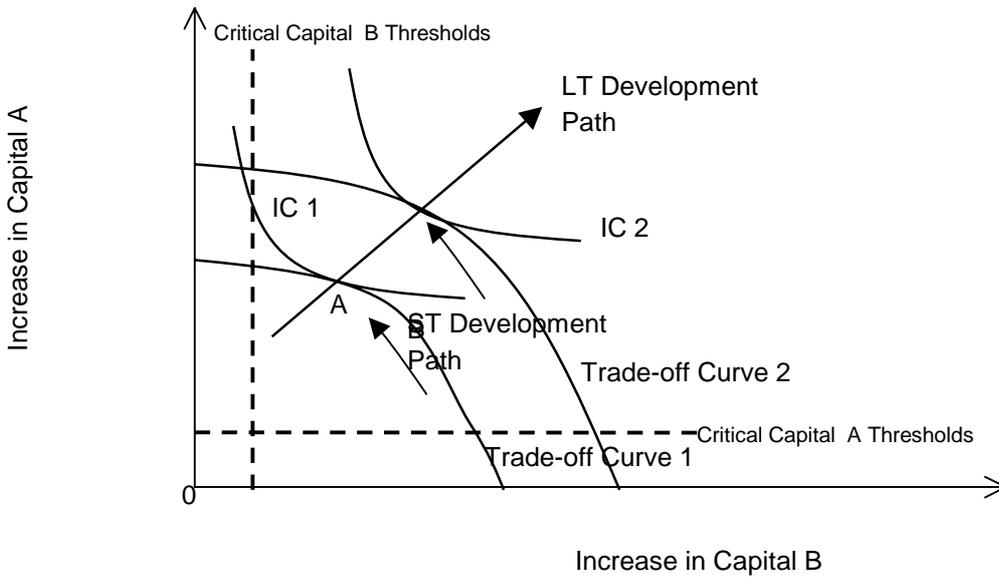
2.7 Regional Development Paths

The idea that sustainable development implies change to the previous development path of a region has been discussed in previous research. Various criteria have been discussed as the basis for determining the requisite changes. One obvious finding is that these criteria have to be determined through a political process, and are therefore likely to be unique (at least in terms of the combination of criteria) to a given region. The evaluation therefore needs to consider the basis upon which regional development paths are defined.

The idea of development paths derives from welfare economics, which posits a long run development in social welfare, defined by the interaction between production possibilities and the preferences of society for alternative combinations of goods and services. The regional development path idea recognises that in the short-run (which might be counted in decades) increases in social welfare come about as a result of improved optimisation between different trade-offs and the expressed preferences of society.

With reference to Figure 2.1 below, this development path is indicated by the move along the trade-off curve 1 towards Point A, tangential with society's preferences for the desired trade-off between capitals A and B (IC 1). In the longer run, through technological change, repairs to depleted capital, changes in consumption and increased economic efficiency, growth in both capitals is possible (win-wins), represented by the move outwards to trade-off curve 2. Optimisation then takes place, guided by the expressed preferences of society (IC 2) to Point B. The long term regional development path therefore passes through points A and B. In practice a combination of optimisation and expansion takes place as regional development.

This development process however assumes that all trade-off possibilities are, subject to society's preferences, capable of improving social welfare. If it is the case that the depletion of capital below certain critical thresholds renders the capital unrecoverable and the loss is vital for the long term development of the region, then there are limits to the range of trade-offs that can be made to increase social welfare, irrespective of society's preferences for the trade-off. Trade-offs to the left and below the critical thresholds marked in the diagram represent such possibilities. Such trade-offs, even if they are desired, render development unsustainable. Desired trade-offs that do not threaten such thresholds are consistent with sustainable development and the increase in social welfare.

Figure 2.1: Regional Development Paths and Trade-offs

The idea of managing trade-offs, and of seeking to minimise the decline of capitals, in line with society's preferences, can be simplified. In Figure 2.2, below, the regional development path is shown (BaU), based on optimising between different capitals. In the longer term, in order to expand total capital and to repair depleted capital, regions will seek, subject to society's preferences, to minimise the trade-offs using good practice. In the long run regions would be looking to avoid a decline in capital and to secure win-wins through policy responses, as indicated by the bold arrow.

Figure 2.2: Regional Development Paths
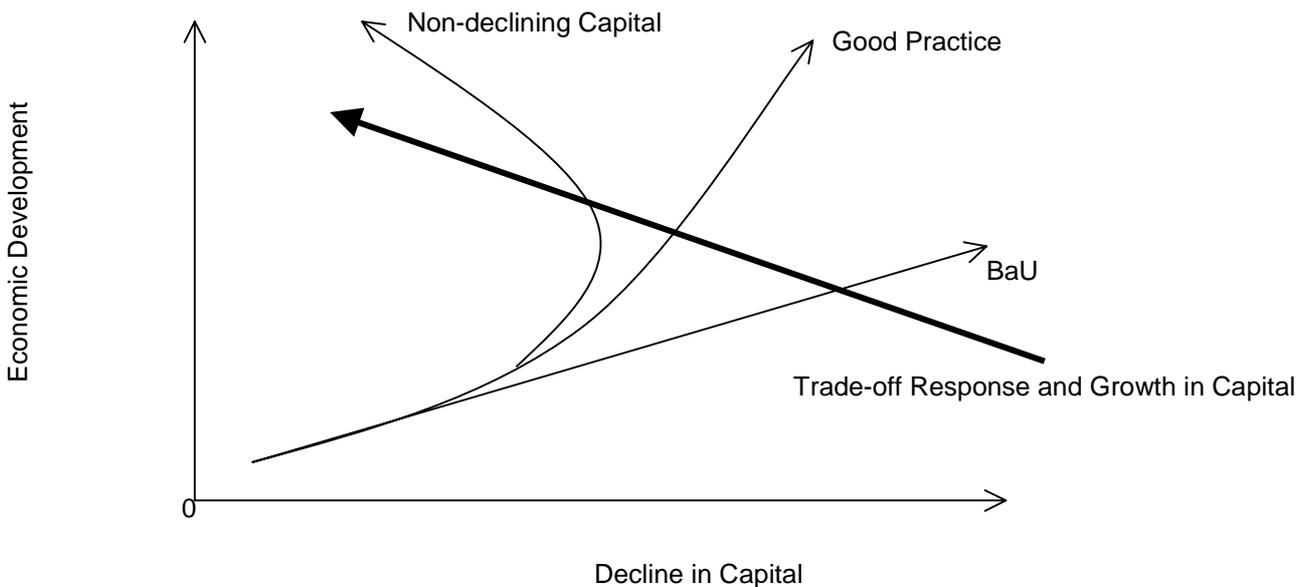
3 A DESCRIPTION OF THE ANALYTICAL FRAMEWORK

3.1 Introduction to the Main Components

The analytical framework comprises three components (Figure 3.1):

Figure 3.1: Outline of the Analytical Framework

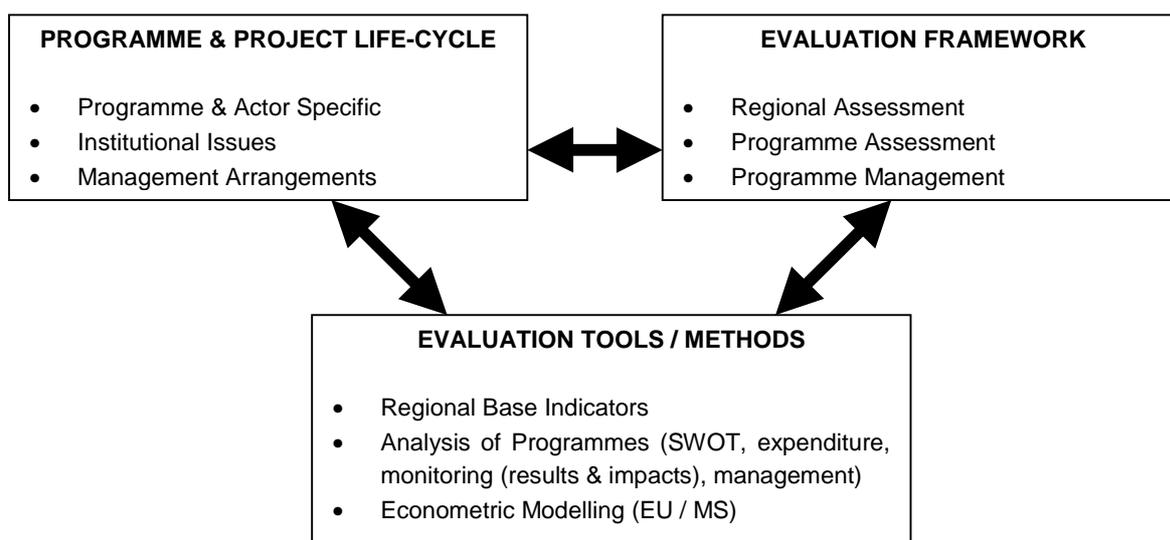| PROGRAMME & PROJECT LIFE-CYCLE	EVALUATION FRAMEWORK
• Programme & Actor Specific • Institutional Issues • Management Arrangements	• Regional Assessment • Programme Assessment • Programme Management

EVALUATION TOOLS / METHODS

- Regional Base Indicators
- Analysis of Programmes (SWOT, expenditure, monitoring (results & impacts), management)
- Econometric Modelling (EU / MS)

- **Programme & Project Life-cycle** – The programme design, management and implementation life-cycle provides the context within which the advice and guidance from the evaluation can be used, recognising the decision points within the life-cycle. There will be variations between MS and programmes. Annex 2 provides an overview for the general case. The Programme design, management and implementation is itself set within the regional context, and especially the regional governance structures, including the various stakeholders (strategic partners) responsible for the effectiveness and efficiency of the programme in the context of domestic regional policy.

- **The Evaluation Framework** – The framework provides the structure for the evaluation exercise, raising specific evaluation questions and incorporating the evaluation tools as a means of assisting evaluators and respondents to reach answers to the various questions. In particular it relates the regional situation as defined by application of the '4-capitals' model to the implementation and management of the programme, to assess the contribution of the SF to SD. The basic framework is elaborated in Section 4.

- **Evaluation Tools & Methods** – These tools & methods comprise the various qualitative and quantitative approaches based on stakeholder judgements, regional and programme indicators and (for the EU and MS) econometric modelling. Details of tools developed for the evaluation are given in Sections 5 and 6.

3.2 Programme & Project Life-cycle

The design, management and implementation of the SF programmes involves a range of actors at EC, MS and local levels, as described in Annex 2. The significance of this component is two-fold:

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- Firstly, the Programme is a reflection of a political process that determines the priorities and the implementation responsibilities. This process is instrumental in determining the effectiveness of the Programme in meeting specified objectives and targets, and contributing to sustainable development. This process is considered implicitly in the assessment of the Programme contribution and management.

- Secondly, the responsibilities and processes for programme management shape the ability to respond to the advice and guidance resulting from the evaluation.

3.3 Evaluation Framework

The evaluation framework links the analysis of regional trends to identify those issues of particular concern for SD in the region (the regional assessment) with an analysis of the contribution of the programme (programme level assessment). This assessment is supported by a review of programme management arrangements to understand how far the contribution of the programme to SD is the result of management decisions and operation.

The regional assessment is based on the measurement of trends in capital stocks, both within assisted and non-assisted regions, as the basis for reviewing the extent to which regions (or MS) are developing sustainably. This provides the basis for considering the contribution of the SF over one or more planning periods, in conjunction with other policy and non-policy influences.

The programme assessment examines the ways in which past and current programmes have responded to the sustainability issues in the region (identified in the regional assessment) and the contribution of programme results and impacts to the level and balance of different capitals. The assessment includes some consideration of the extent to which activities might otherwise have been undertaken in the absence of the programme (by reference to other domestic and regional policies) and hence the possible 'added value' of the SF.

Programme management considers the design and operation of programmes, especially in the current planning period and the response to the need to promote SD and to generate and select projects accordingly. Programme managers have had a number of guidance tools including the Vade Mecum, the Guide to ex-ante environmental evaluation (which includes wider consideration of SD) and exemplar case studies of relevant projects that are especially directed to helping with project generation and appraisal. Improvements in this area are of particular interest.

3.4 Evaluation Tools & Methods

Indicators are used to help define the assessment. In particular the emphasis is on the definition and use of regional base indicators to describe those characteristics deemed by stakeholders to be of particular significance for the sustainable development of the region. In addition, there are impact indicators relating the consequences of SF interventions to Programme objectives.

Programme assessments provide the core of the evaluation. These assessments are conducted within a framework which links the four types of capital to the particular interventions funded by the SF. The framework is complemented by a series of research and evaluation protocols designed to understand the contribution of programmes to SD, in terms of the (planned and unplanned) results and impacts of intervention, and the management of the programmes.

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Economic modelling provides a macro-economic assessment of the contribution of the SF by defining a 'counterfactual' scenario where there are no SF programmes, and the finance is assumed to remain with Member States in the form of lower taxes equivalent to the value of the SF. The resulting impacts can be defined using indicators relating to the different types of capital. However, as an economic model, the range of indicators that can be used is limited. In particular, indicators relating to social capital can not be defined with respect to the model.

4 EVALUATION FRAMEWORK

4.1 Summary of the Framework

The analytical framework described in the previous section is applied through a structured agenda of questions and analysis, informed by both qualitative and quantitative information, obtained through a combination of desk based research, structured interviews with various national, regional and programme stakeholders, supported by available data on regional trends.

The analytical framework includes the tools for the EU level assessment. This is based on regional analysis using base indicators, regional case studies of selected SF interventions, the framework and protocols for which are described in this section and econometric modelling.

The case study evaluation comprises both an assessment of the contribution of SF to SD and of the opportunities to improve programme management. The evaluation framework comprises three parts:

- Part A: Regional Level Assessment

- Part B: Programme Level Assessment

- Part C: Programme Management .Assessment

The first two parts provide the assessment at the regional level of the contribution of SF to SD, while the third part assesses process issues relating to programme management. The basic framework for the assessment in Parts A and B is the impact matrix (Table 4.1), which relates the measures in the SF programmes, and large projects , to trends in the four capitals and trade-offs specific to the region. The assessment in each cell of the matrix provides an appreciation of the contribution of the SF to SD. Aggregation by all specified SD trends and SF measures/projects, provides the overall assessment. Note that the aggregation process has to be undertaken qualitatively, given the nature of the measure specific assessments. However, the value of the assessment lies in the dis-aggregation of the analysis, as a basis for subsequent policy review and revision.

Note that the evaluation framework is applied at national (Greece, Portugal, Ireland), sub-national (new German Lander) and regional levels. There are 15 regions selected, all NUTS level 2 (except the selected German Lander (NUTS level 1)). The framework description below refers to regional level assessment. For simplicity, this term is taken to include the national and sub-national levels as well.

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Table 4.1: Assessment Framework

All SF Programmes & Projects in the Region	Selected Measures & Projects	Planned or Actual Spend (% of P)	Key Trends in SD (Case defined)				Key Trade-Offs		Summary of the Contribution of the Measure
			Econ Capital	Human Capital	Social Capital	Natural Capital	Case defined	Case defined	
Programme 1 (P1): Aim & Budget	M1		M1 contrib				M1 contrib		
	Mn								
	Summary of P1								Overall Prog Summary
Programme n (Pn): Aim & Budget	M1								
	Mn								
	Summary of Pn								
Summary of Programmes & Selected Measures & Projects									Overall Regional Summary

The impact is defined as being one of the following:
positive (✓), negative (✗), neutral (O), unknown (?)

All noted impacts will be supported by explanatory descriptions.

4.2   Parts A and B: Regional and Programme Assessment

The evaluation framework seeks to establish the specific trends considered especially important for the sustainability of the region's development. These trends represent the criteria for assessing the contribution of selected SF interventions. The assessment has to recognise that the SF programmes are focused on promoting economic and social development. They are not explicitly pursuing the objective of sustainable development, although increasingly SF are being applied within a regional policy framework that does explicitly pursue sustainable development (see findings in Volume 1). The evaluation framework has therefore to recognise the actual objectives and evaluation framework applied to SF programmes.

EC 1999 (p.6) distinguished between three different kinds of objectives for the SFs:

- Operational objectives are expressed in terms of outputs (e.g. the provision of training courses to the long-term unemployed);

- Specific objectives are expressed in terms of results (e.g. the improvement, through training, of the employability of the long term unemployed);

- Global objectives are expressed in terms of impacts (e.g. a reduction in unemployment among the previously long term unemployed).

With regard to indicators, EC 1999 (p.8) identified the following kinds of indicators as relevant to an evaluation of the SFs:

- Input indicators: The budget allocated to each level of assistance. Financial indicators are used to monitor progress in terms of the (annual) commitment and payment of the funds available for any operation, measure or programme in

relation to its eligible cost. These indicators are readily available but give little information about the effectiveness of the SFs.

- Output indicators: These relate to the activity engaged in through the application of the SFs and may be physical (e.g. length of road constructed) or financial (e.g. number of firms supported).

- Result indicators: The direct and immediate effects of a programme. The indicators provide information on changes to, for example, the behaviour, capacity or performance of direct beneficiaries. Such indicators can be of a physical (reduction in journey times, number of successful trainees, number of roads accidents, etc.) or financial (leverage of private sector resources, decrease in transportation cost) nature.

- Impact indicators: These refer to the programme's consequences beyond its immediate effects. Specific impacts are those effects occurring after some time but can be directly linked to the action taken. Global impacts are longer-term effects affecting a wider population. The impacts that are of interest are those which either support, or are in conflict with, the achievement of other policy objectives.

If the lines of cause and effect can be adequately established, it would clearly be desirable for the indicators to follow the sequence:

inputs ➡ outputs ➡ results ➡ impacts

Such a sequence should be easiest to establish for inputs, outputs and results. Measuring impacts is complex and clear causal relationships are often difficult to establish. (ECOTEC 1999 [p.61] reported extreme difficulty in relating environmental pressure indicators to SF programme measures). It may be necessary to include some impacts which can plausibly be linked to the application of the SFs, but not in a direct way. In order to establish the contribution of a programme it is also necessary to define in advance a range of base indicators that are relevant to the overall objectives of the region, and to judgements as to the sustainability of the region. It is against these base indicators that the actual contribution of the programmes will need to be assessed.

EC 1999 (p.9) also lists a number of issues which any evaluation must address:

- *Relevance:* To what extent are the programme's objectives relevant in relation to the evolving needs and priorities at national and EU level?

- *Efficiency:* How were the resources (inputs) turned into outputs or results? Efficiency analysis looks at the ratio between the outputs, results, and/or impacts and the inputs (particularly financial resources) used to achieve them.

- *Effectiveness:* How far has the programme contributed to achieving its specific and global objectives? Effectiveness analysis compares what has been done with what was originally planned, i.e., it compares actual with expected or estimated outputs, results, and/or impacts.

- *Utility:* Did the programme have an impact on the target groups or populations in relation to their needs?

- *Sustainability:* To what extent can the changes (or benefits) be expected to last after the programme has been completed?

These issues are related to the objectives and indicators of a programme as in Figure 4.1.

Figure 4.1: Key Evaluation Issues and their Relation to Objectives and Indicators
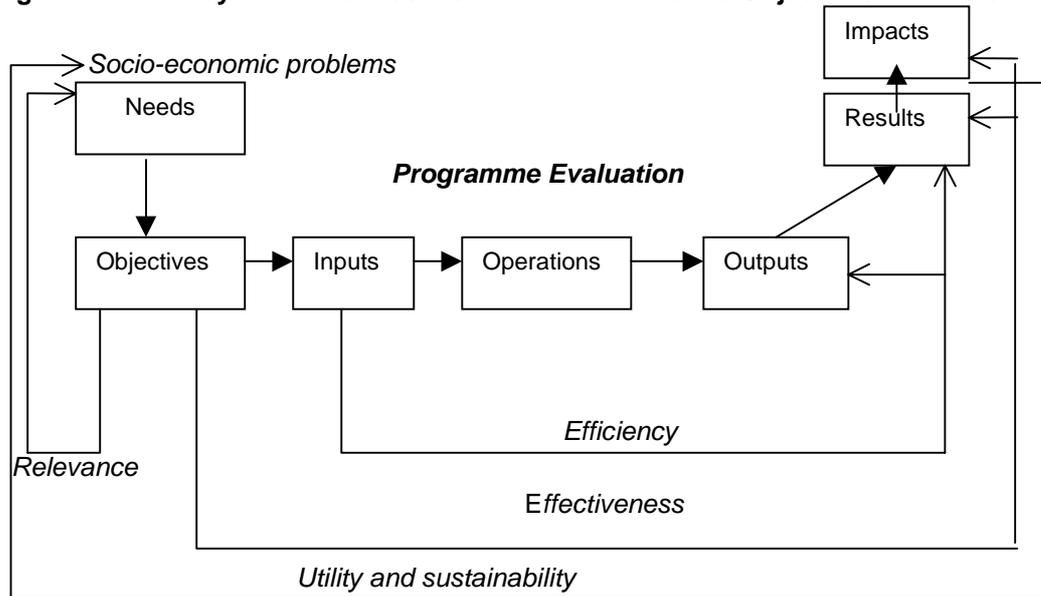
Source: EC 1999, p.9

The evaluation issues, objectives and indicators may then be related in a matrix as in Table 4.2. Base indicators are defined in relation to the needs which it is intended that the SF programme will address. Output, result and impact indicators are defined in relation to the objectives of the programme. A comparison between the actual and planned outputs, results and impacts indicates the effectiveness of the programme. A comparison between outputs, results and impacts and the costs (financial inputs) indicates the efficiency of the programme. The extent to which the outputs and results are sustained following the end of the programme indicates the sustainability of the programme. The relationship between the impacts of the programme and the base indicators relating to the perceived needs gives an indication of the relevance of the programme, while the change in these context and baseline indicators due to the programme's impacts indicates the utility of the programme.

Table 4.2: An Evaluation Framework for an SF Programme

	Indicators	Effectiveness	Efficiency	Sustainability	Utility
Programme activities	Financial input				
Operational objective	Financial/ Physical Output	Actual/planned output	Output compared to cost	Extent to which output and results will be continued after end of programme	
Specific objective	Result	Actual/planned results	Results compared to cost		Improvement in context, baseline and other indicators related to needs
Global objective	Impact	Actual/planned impacts	Impacts compared to cost		
Needs	Base				

(Source: adapted from EC 1999, Table 2, p.10)

From the perspective of assessing the contribution to sustainable development, the key elements of the SF evaluation framework therefore relate to the relevance and utility of the programme to the region's needs. It is the region's needs that represent the wider social welfare requirements of the region and which form the basis of the perceived requirements for sustainable development. It follows that the Regional Assessment has to generate an adequate description of these needs as the basis for defining the relevant assessment criteria; and that the Programme Assessment has to consider whether the objectives of the programme and the types of impacts associated with the SF interventions meet the specified needs.

As previously noted, the SFs are a relatively small part of any country or region's overall economic activity, and cannot be expected to strike out on a sustainable development path all by themselves. But the SFs are of a sufficient size to be able in some contexts either to reinforce the old unsustainable development path, or to contribute to a shift towards sustainability. An important priority of a sustainable development evaluation framework for the SFs would therefore seem to be the ability to give insights into whether or not the SFs were in fact improving the eco-efficiency of the regions in which they were being implemented, as well as their economic, social and environmental impacts overall.

This gives a new interpretative twist to the effectiveness and efficiency columns in Table 4.2. With regard to effectiveness, it will not be just actual/planned impacts that are of interest, but also planned/unplanned impacts, where the planned impact might be some aspect of economic development, and the unplanned impact some negative environmental effect. In this case the 'eco-effectiveness' of the SF intervention will depend on the extent to which this ratio is above or below a benchmark figure from elsewhere in the economy. Similarly with regard to efficiency, it will not just be impacts/input cost that are of interest, but also impacts/environmental damage. SFs may only be said to be moving the region or country towards sustainable development if this measure of 'eco-efficiency' was substantially higher than the average for their economy as a whole.

It can therefore be seen that the evaluation framework of Table 4.2 is well suited to give insights into the important sustainable development concepts of eco-effectiveness and eco-efficiency. It remains, however, to make it more suitable for the evaluation of sustainable development as a whole.

4.3 Evaluation of the Structural Funds' Contribution to Sustainable Development

The sustainable development concept which has been chosen as the core model for this evaluation project is the four capitals model. As discussed above, this model distinguishes between environmental (or natural), human, social/organizational and manufactured capital. It also notes that the quantity of capital may be measured either according to the stock of the asset which it comprises, or in relation to the flow of benefits to which the capital stock gives rise. The contribution of the SFs to sustainable development can therefore be assessed against indicators which show trends in the stocks and flows of the different types of capital. The assessment will be informed by the Outputs, Results and Impacts from an SF programme.

Therefore, in order to relate the earlier discussion on SF evaluation to sustainable development, it is only necessary to divide the indicators into eight kinds, corresponding to the stocks and flows of the different types of capital. This leads to a matrix for the evaluation of the SFs of the form shown in Table 4.3, which may be visualized in terms of adding an extra dimension to the indicators column in Table 4.2.

The Policy synergy/conflict column is included in recognition of the fact that an SF programme is likely to have multiple economic, social and environmental impacts. While, hopefully, its major intended impacts will generate utility in relation to meeting human needs, as illustrated in the final column of Table 4.2, it may have other impacts, which may be positive or negative and may be synergistic or in conflict with other policy objectives. This is likely to arise especially in relation to economic and environmental policy objectives.

The main purpose of the SFs is to generate economic development in selected European regions. The indicator framework enables the evaluation to measure the extent, efficiency and effectiveness with which it has achieved economic development (as shown in Table 4.2), but also will show up any other impacts (perhaps negative environmental effects associated with the economic development) which may conflict with other policy objectives (as shown in Table 4.2). This framework can therefore give insights into the contribution of the SFs to sustainable development as a whole.

Table 4.3: An Evaluation Matrix Relating Indicators to the Four-Capital Model

Type of Capital	Stock/ flow	Type of Indicator				Policy synergy/ Conflict
		Inputs	**Outputs**	**Results**	**Impacts**	
Environmental/natural	Stock	E/S/In	E/S/O	E/S/R	E/S/Im	+ (synergy) - (conflict)
	Flow					+, -
Human	Stock					+, -
	Flow					+, -
Social/ Organisational	Stock					+, -
	Flow					+, -
Manufactured	Stock					+, -
	Flow					+, -

In Tables 4.2 and 4.3 each major budget line in an SF 'implementation field' (as listed in Annex 3 may be characterised as an 'input'. It may be hypothesised that each input is intended to increase the stock or flow associated with one of the types of capital in Table 4.3. If, for example, the first input was directed at road construction, then the output might be the number of km of road built. One result might be a flow rather than a stock, for example, an increase in freight or passenger movements. There could certainly be a number of impacts, such as increased air emissions, loss of habitat, impacts on community, such as in- or out-migration, and the attraction of new investment in industrial buildings. In this way an attempt can be made through the matrix to map the full impacts of the SF inputs on each of the four types of capital.

This structure would very soon become unwieldy unless it were possible to limit the number of indicators in, especially, the Results and Impacts columns. In practice, these are likely to be limited in part at least by data availability. The entries in the Inputs and Outputs columns will be largely dictated by the natures of the uses to which the SF investments were put. The extent to which this framework could be made operational would then depend on:

- The ability of a limited number of indicators to capture the Results and Impacts of the SFs across the four different types of capital.

- The availability of data to populate the theoretically desirable indicator set.

If these two conditions could be met (which might in turn require some adjustment of the ideal indicator set), then it would be possible to enter the Results and Impacts of each of the SF Inputs and Outputs and build up an aggregate effect of the SF programme as a whole on the range of indicators. For any given SF programme to be evaluated, each of the cells of the matrix would have a number of indicators, with each Input in each cell traced through to the Outputs, Results and Impacts with which it is associated, and the Outputs, Results and Impacts then aggregated for the programme as a whole. This would then allow conclusions to be drawn about policy synergies or conflicts in the last column of the matrix. The symbol in the final column would need to be explained in the text accompanying the matrix in terms of whether the impacts arising from the SF Input (or from the programme as a whole) had been in synergy or conflict with other policy objectives relating to sustainable development.

The indicators in Table 4.3 could then be related back, as in Table 4.2, to the operational, specific and global objectives of the SF programme. Measures of effectiveness and efficiency for the programme could be generated using these indicators. The sustainability of the programme's results and impacts could be estimated directly from the capital indicators (sustainability in economic terms is often defined as maintenance of the capital stock). The indicators would also yield a measurement of the extent to which the programme had met the needs towards which it was directed, and this could be compared with the other impacts (positive and negative) which it had generated. In this way the evaluation framework would give policy makers insights into the policy synergies and trade offs generated by SF programmes in a direct and transparent way.

EC 1999 has already gone a long way to making this framework operational by giving a large number of examples of output, results and impacts indicators for some of the SFs' fields of intervention. These have been reproduced in Annex 3, showing the type of capital on which the SF has had its principal effect, and whether the effect has been on the stock or flow.

4.4   The Assessment Framework

However, this evaluation seeks to go beyond the immediate results and impacts of the SFs' interventions identified in Annex 3, and consider a wider range of indicators related to the four capitals model as well as impacts not captured by the impact indicators (which are defined in relation to objectives). Moreover, quantification of the results and impacts of interventions is itself difficult, partial and limited to available formal ex-post evaluations.

The assessment framework (Table 4.1) represents a further extension of Table 4.2, by focusing on the inputs (the interventions) and the impacts on each of the different capitals. The interventions relate to each of the different types of capital, but the impacts can relate directly to the same type of capital, or indirectly to a different one. The primary focus is the effect that a given intervention (or group of interventions) makes to the different types of capital, as represented by specified criteria, taking into account the direct and indirect effects. Table 4.4 summarises some of the links between particular types of interventions and the effects on different types of capital.

The assessment framework then becomes a set of rows, one for each intervention, and a set of columns, one for each criteria, grouped according to the type of capital they represent. The cells in the resulting matrix summarise the contribution of the intervention on each criteria. It is possible depending on the intervention and criterion for the contribution to be quantified, but more usually the assessment will only be possible as a qualitative judgement.

Table 4.4: Indicative Linkages between the Direct Impacts of an Intervention and the Indirect Effects on Other Capitals

Type of Intervention	Types of Impacts / Outcomes			
	Manufactured Capital	Human Capital	Social Capital	Natural Capital
Manufactured Capital	*Economic growth, structural economic changes, higher value added activities*	Improved productivity. Changes in occupations, with higher incomes, lower H&S risks	Transport infrastructure impacts on community (eg severance, accessibility), ICT impacts on networks, levels of social interaction, accessibility. Firms as social capital	Infrastructure impacts on the environment (eg land take, pollution from use). Resource and pollution impacts from changes in levels & types of economy, tourism, agriculture, forestry, fishing, industry (production effects). Impacts of spatial planning
Human Capital	Improved productivity, increased levels of innovation	*Skills, Health, Employment, R&D, Levels of entrepreneurial activity*	Labour market impacts (eg changes in housing markets), home/work balance. Impacts from changes in income levels. Corporate responsibility	Improved environmental awareness & eco-efficiency. Impacts from higher income levels (consumption effects).
Social Capital	Development of business and sector clusters of economic activity. Improved productivity. Technology transfer.	Capacity development for training, increased participation in education & training, increased business competencies, higher rate of start-ups, improved health of workers. Third party finance initiatives for public goods.	*Business & research networks, advisory services. Community development*	Increased participation in environmental actions, eg recycling. Shared responsibility, higher levels of compliance / reduced enforcement action. Local co-operation measures in response to environmental issues. Clean technology clubs
Natural Capital	Eco-industry. Increased tourism assets. Increased (long-term) productivity of forestry, fishery and agricultural assets. Increased productivity from clean technologies. Increased use of brownfield land	Employment in eco-industry. Environmental awareness & training. Health benefits from environmental improvements.	Increased sense of 'place' & 'ownership' of the local environment. Community confidence, reduced environmental risks.	*Improved environmental protection and resource management & conservation. Heritage conservation*

Note: the cells on the leading diagonal reflect the direct impacts / outcomes (in italics). These are the desired and planned impacts. The impacts described in the other cells are those which might potentially be expected to occur as a result of the direct impacts. These impacts can be positive or negative.

4.5 Methodological Implications of the Assessment Framework

The assessment methodology has a number of features that should be recognised.

4.5.1 The Use of Indicators

There are essentially two sets of indicators to consider. The first are regional base indicators, that describe regional change. In the context of the assessment framework, the base indicators have two purposes: the first is to provide some justification for the selection and description of the criterion; the second is to provide a benchmark against which the effects of interventions can be judged.

The second type are the result and impact indicators of the SF programmes and projects. To the extent that these relate to the range of effects that are of interest as defined by the selected criteria, they obviously help to inform the assessment. In many cases however, it is unlikely that there will be relevant impact indicators and still less chance of recent quantification. Of interest in the case studies is the extent to which the needs of the region in relation to sustainable development (which find expression in the base indicators) approximate to the objectives of the SF (which find expression in the impact indicators).

4.5.2 Quantitative or Qualitative Assessment

As previously noted, the assessments taking place in each cell could be quantitative (for example the impact of an intervention to support businesses, that leads to 'x' increase in output that results in some change in natural resource use). However, in practice the problems of quantifying the direct results and impacts of interventions, and then tracing and quantifying indirect Impacts, makes quantification across the range of interventions and criteria extremely difficult within any 'normal' evaluation budget.

Instead of quantification, qualitative assessments are possible based on an appreciation of the types of linkages between an intervention and the specified criteria, combined with some appreciation of the role of other policy interventions in relation to the criteria.

4.5.3 Aggregation and Weighting of Impacts

The individual assessments by intervention or by criteria are by themselves important findings for shaping future regional development programmes. Since most interventions will have positive and negative consequences for different types of capital there is an interest in aggregating the different effects of an intervention. Again it is necessary to conduct this as a qualitative exercise. Implicit in any aggregation exercise of this type, is a judgement about compensation, does a positive effect on one criterion outweigh a negative effect on a second? The qualitative assessment of aggregated effects has to make explicit the views taken in relation to the extent of compensation.

The aggregation across criteria raises the question whether each of the criteria is judged to be of equal importance, and whether the effects on one should be judged to be more important than the effects on a second. The selection of the criteria is a normative choice, as articulated through the political process, based on some view about what features of social welfare are especially important for the sustainable development of the region. It is possible that the same process could generate some explicit or implicit weighting which could then be used in the evaluation.

In the absence of any such weighting the assessment effectively assumes an equal weighting for each criterion. Evidence form the case studies suggests that there is very little weighting, with the governance process preferring to avoid the choices that would be associated with such an exercise. However, evidence from the case studies can be used to suggest, ex-post, the effective existence of a weighting system as demonstrated in actual policy choices.

4.5.4 *The Assessment of Trade-offs and Win-wins*

The assessment framework includes a number of columns that seek to capture particular regional issues relating to the decline or increase in a particular type of capital, and where there is some appreciation of the cause in the form of decline or increases in some other type of capital. To the extent that these trade-offs and win-wins encapsulate the key issues for the sustainable development of the region the contribution of the SF to them provides a particular insight. It is suggested that perhaps in any subsequent application of the assessment framework that the framework could be condensed to a focus on defining and assessing the key trade-offs and win-wins and the effects of the SF.

The description of trade-offs and win-wins implies some appreciation of cause and effect. However it is not always obvious what the causal chain is, other than some general awareness that there are links between changes in one type of capital and another. These gaps in understanding of cause and effect represent further challenges to the specification of regional sustainable development and of the contribution of policy interventions. The case studies can highlight where particular links are important but uncertain.

4.6 Part C: Programme Management

The impact of the Structural Funds on the ground in the regions of the Community is dependent upon a large number of choices taken at key decision points at EU, national, regional, local and even individual levels. These range from broad strategic decisions taken by EU Heads of Government concerning the size and distribution of resources allocated to the Structural and Cohesion Funds, to the details of project scoring criteria taken by Managing Authorities in the regions.

The nature of these decisions is influenced by the kind of administrative structures which are put in place; the organisations which are represented; the range of stakeholders whose views are taken into account; and the type of organisations which come forward with project applications. At each of these key points, there are (or have been) potential opportunities for 'mainstreaming' sustainable development themes in SF implementation.

Table A2.1 at the end of Annex 2 sets out the key decision points associated with the design and implementation of the Structural Funds and the Cohesion Fund for the current 2000-2006 programming period. The first two pages of the table are focused on key points at EU and Member State levels, while the remaining sections address decisions at programme and project levels. It is these latter sections that have been used to develop the protocol in Section 6, below for evaluating programme structures and processes at a regional level.

The protocol is intended to guide discussion with consultees. It is not expected that all questions are answered or structured precisely as given. The discussion is intended to provide insights into how programme management has influenced the contribution that the SF has had on SD. In particular, given the general concern about the ability of project sponsors and promoters to bring forward projects that

take SD into account, particular emphasis should be given to the project generation and selection processes.

The discussion is also intended to support recommendations for changes in programme management that better support SD and that can be introduced at either the mid-term evaluation and/or in the next programming period. Good practice should therefore be highlighted and explained.

The extent to which Programme management has benefited from or has introduced learning processes that support 'mainstreaming' of SD should be identified. In particular the evaluation will consider:

- the extent to which capacities for integrated and longer term planning are being developed

- the changing role and strength of programme partnerships and changes in levels of participation, and exchange of experience with, regional stakeholders

- the extent to which the transparency and subsidiarity of programme management has improved.

5 EVALUATION TOOLS – BASE INDICATORS

5.1 The Need for Indicators of Sustainable Development

In order to make operational the four-capitals model of wealth creation and the concept of sustainable development to which it has been linked, and to give guidance as to how development may be made more sustainable, a framework of indicators is required, where an indicator may be defined as a measure which gives summary and meaningful information about a situation of interest.

Since the UN Conference on Environment and Development in 1992, which established the idea of sustainable development as an overarching policy objective, there has been an explosion of activity to develop sustainable development indicators (SDIs), in order to determine whether sustainable development was actually being achieved. Because the meaning of sustainable development was not particularly clear (and is still often the source of some confusion), this activity was characterised by much experimentation. Many indicator sets were put forward by different bodies at different levels (international, national, regional, local), and substantial efforts have since been invested in seeking to rationalise these into 'core' sets that can be used for comparison and benchmarking, while the development of particular sets of indicators for specific purposes has continued to flourish.

In order to generate an indicator framework for this project making maximum use of previous work in this area, two main sources, or sets of sources, of extant information have been used:

i) The 1999 Working Paper from the European Commission outlining an indicative methodology for the monitoring and evaluation of the SFs (EC 1999). It seems important to follow this methodology as far as practical, in order to achieve the maximum possible consistency with ongoing efforts at monitoring and evaluation of the SFs. In practice, the sorts of data collected so far in relation to the SFs varies hugely between different projects, but are biased towards the input indicators (the investments made) and descriptive indicators, geared to measuring the SFs' economic performance (IRS, 2000). Such data include traditional measures of GDP and productivity, but also employment and unemployment characteristics.

ii) A range of environmental and sustainable development indicator sets produced by other bodies, including EUROSTAT, the OECD, the European Environment Agency (EEA). These indicator sets are briefly reviewed, and the indicators listed, in the Review of Major Environmental and Sustainable Development Indicator Sets, which is another accompanying paper of this Stage 2 Report. For the moment in relation to this project the priority is to use these indicator sets to help develop an operational indicator set which can be used by the evaluation teams in the different countries.

5.2 Evaluating the SF Programmes

The basic criteria applied by EC 1999 (p.29) in relation to its derivation of a set of indicators for the evaluation of the SF programmes were:

- *Relevance*. The indicators need to be clearly related to the priorities and objectives of the SFs. EC 1999 sets out the fields of intervention of the SFs, which provide the clearest link between the SF objectives and the activities

which seek to achieve them. These fields of intervention are reproduced at Annex 1 (together with related indicators, which are discussed further below).

- *Quantification.* This criterion ensures that the indicators can be used to set targets and, where appropriate, establish baselines.

- *Reliability.* This criterion is important for clarity of definition and ease of aggregation of the indicators.

- *Availability.* Data need to be available for entry into the monitoring and evaluation system for the indicators. Ideally they should be in time-series form dating from before the application of the SFs, to give a chance of identifying the SFs' effects.

Other essential criteria for indicators for this project are:

- *Usefulness.* This criterion begs the question of useful to whom. For the purposes of this evaluation, the indicators will need to be useful to EU and national policy makers and those concerned with the operation of the SFs. To be useful to this group, the indicators will need to measure and give insights into policy-relevant issues and trends. It will be especially desirable in this category to have indicators that can show up any conflicts between the application of the SFs and other policy objectives.

- *Related to the four capitals model.* This is the model which has been chosen for this evaluation. Indicators in relation to this model will need to be expressed either as a stock of one of the four types of capital, or as a flow either emanating from such a stock, or a flow which may have an impact (positive or negative) on such a stock. It will be important to have indicators for each of the four types of capital being considered (environmental or natural, human, social or organisational, and manufactured).

5.3   The Type of Relevant Indicators

There are an enormous number of indicators that have already been produced with the aim of generating insights as to the achievement of both environmental and sustainable development goals. Some of these indicator sets are reviewed (and given an IS number), and their indicators listed in Annex 4. Below we briefly review the types of indicator that have been suggested as being relevant to each of the different types of capital.

5.3.1   *Environmental/natural capital:*

In all the work on indicators of sustainable development that has taken place since 1992, most efforts have been invested in developing and making operational environmental indicators. It seems desirable to build on and use this experience rather than to start again from scratch.

An environmental evaluation of the SFs has already been carried out, by ECOTEC in 1999. Since then EUROSTAT has produced a set of environmental indicators (IS2) based on a major expert consultation, the European Environment Agency has produced its Environmental Signals indicators (IS5), and the OECD has continued to produce its Compendium of Environmental Indicators (IS3A). Environmental indicators also form a major component of the sustainable development indicators sets reviewed in the IS paper, and the EU Council of Ministers has agreed an

environmental indicator set in relation to the EU's Sustainable Development Strategy.

The frameworks of environmental indicators produced by EUROSTAT and the OECD are as in Table 5.3. It can be seen that there is substantial overlap, but also a few differences. A preliminary choice of environmental indicators chosen from the above sets is given in the table at the end of Annex 4.

Table 5.3: Structure of the Environmental Indicator Sets of Eurostat And OECD

ENVIRONMENTAL THEMES	
EUROSTAT	*OECD*
Themes (pollution) Climate change Ozone depletion Air pollution Waste Water pollution Dispersion of toxic substances	***Pollution Issues*** Climate change Ozone layer depletion Air quality Waste Water quality
Themes and indicators (resource depletion) Water consumption Timber balance Urbanisation of land Energy use Fishing pressure Loss of biodiversity	***Resource Issues*** Water resources Forest resources Land resources Energy resources Fish resources Biodiversity (and wildlife) Mineral resources
Mixed resource and pollution themes Marine environment and coastal zones Urban environmental problems	***Key Sectors*** Energy, Transport, Industry, Agriculture ***Other Issues*** Risks Environmental expenditure and taxes Multilateral environmental agreements

5.3.2 *Human Capital*

Human capital has been defined as "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (OECD 2001, p.18). The key function in the creation in the creation of human capital is learning. This may be learning within the family and early childcare settings, formal education and training, workplace training and informal learning at work or in daily life. There is much evidence that learning is much influenced by "cultural capital" - "the collection of family-based resources such as parental education levels, social class, and family habits, norms and practices which influence academic success" (OECD 2001, p. 23). Major specific influences include work habits of the family, academic aspirations and expectations and the support and guidance to help achieve them, and a stimulating environment for thinking, imagination and discussion of ideas and events. Learning is negatively

affected by social disadvantage, but can be positively affected by aspects of social capital to be discussed further in the next section: "The potential for school, community and family partnerships to support learning is especially relevant to families from disadvantaged areas and backgrounds where they can at a treble disadvantage of poor access to income and employment as well as social networks" (OECD 2001, p.92). Putnam (2000) found that learning outcomes were strongly and significantly correlated with a composite measure of social capital comprised of the following indicators:

- Intensity of involvement in community and organisational life
- Public engagement (e.g. voting)
- Community volunteering
- Informal sociability (e.g. visiting friends
- Reported levels of trust

An important conclusion is, therefore, that "a key to raising overall literacy standards and meeting future skill needs may be to address pockets of low skill linked to social and educational inequalities" (OECD 2001, p, 26). It seems important to try to ascertain whether the SFs have had this kind of effect.

There is substantial evidence that human capital levels are positively related to wages, employment and economic growth. Indeed, one would expect these to be the principal economic benefits to flow from human capital. There is also substantial evidence that human capital is positively related to non-economic social and personal well-being, which may in turn feed back into economic growth. In fact, "the indirect impact of education of economic growth via social benefits may be as large as the direct impacts" (OECD 2001, p.33), where the social benefits include better health, lower crime, political and community participation, social cohesion, more volunteering and charitable giving and better educated children. There is a case for regarding health itself as an element of human capital, because it is clearly positively related to productivity. These other social benefits of education may be regarded as elements of social capital, to be discussed in the next section, so that human and social capital are obviously closely inter-related.

Human capital, the benefits flowing from it, or proxies for these may be measured in a number of different ways, all of them more or less problematic:

- Education spending, or other expenditures such as on research and development. These are input measures. There is no guarantee that they result in human capital and corresponding output benefits.

- Educational credentials (e.g. years of schooling or other education at various levels, or enrolment rates) and qualifications. These are output measures but there is no guarantee that these outputs are actually being put to productive use (i.e. they may be a stock of human capital in theory, but they may not be leading to a flow of benefits).

- Various measures of training and the higher skill levels to which they lead. It is likely that employment-based training, although an input measure, leads to its intended outputs and benefits because qualified in this way often move into more advanced employment in a related filed.

- Surveys of student achievements or adult skills, of which easily the most commonly investigated is various forms of literacy (e.g. prose, document, quantitative literacy).

- Health status.

- Indicators of motivation and productivity, such as absenteeism (for health or other reasons) from work.

- Employment and unemployment, and average wages. All jobs presuppose a certain level of human capital, and the level of this should be related to wages.

- Indicators of disadvantage, leading to educational and learning disadvantages, or of the outcomes of measures and policies to reduce it.

- Levels of invention or entrepreneurship, as shown for example in numbers of patents or new business start-ups.

A preliminary choice of indicators under these broad headings, chosen from the various indicator sets that have been identified, is given in the Human Capital table at the end of Annex 4.

5.3.3 Social Capital

In essence social capital derives from relationships. Distinctions in the literature include those between 'bonding', 'bridging' and 'linking' relationships, where the first relate to the close ties mainly between kin and ethnic groups, the second to the relationships that allow individuals to transcend those groups, while linking relationships connect individuals and groups to other groups and institutions. It should be noted that, unlike other forms of capital, the attitudes and activities generated by social capital may not necessarily be in the broad social interest: closely bonded groups may be exclusive; the activities of some closely bonded groups may be anti-social (e.g. criminal gangs); and other groups may pursue their own narrow interests at the expense of society at large (e.g. business associations or trade unions).

The definition of social capital in OECD 2001 (p.41) is "networks together with shared norms, values and understandings that facilitate co-operation within or among groups". However, this seems an unnecessarily narrow definition, and for the purposes of this project it is proposed also to include in social capital various other social arrangements which are recognised by the OECD as being closely related to its preferred concept:

- Organisational capital, which "reflects the shared knowledge, teamwork and norms of behaviour and interaction within organisations" (OECD 2001 p.19)

- Cultural capital, "the habits or cultural practices based on knowledge and demeanours learned through exposure to role models in the family and other environments" (OECD 2001, p.23).

- Political, institutional and legal arrangements (which may be also considered to include financial institutional arrangement).

Social capital is discussed in some detail in World Bank (1997, pp.77ff.). This publication notes that there are broadly three views on what social capital consists of: informal and local horizontal associations; hierarchical organisations (such as firms and professional associations); and formalized national structures, such as government and its agencies and legal arrangements. These three descriptions of social capital share several common features:

- All link the economic, social, and political spheres. They share the belief that social relationships affect economic outcomes and are affected by them.

- All focus on relationships among economic agents and how the formal or informal organization of those can improve the efficiency of economic activities.

- All imply that 'desirable' social relationships and institutions have positive externalities. Because these cannot be appropriated by any one individual, each agent has a tendency to under-invest in social capital; hence, there is a role for public support of social capital building.

- All recognize the potential created by social relationships for improving development outcomes but also recognize the danger for negative effects. Which outcome prevails depends on the nature of the relationship (horizontal versus hierarchical) and the wider legal and political context." (World Bank 1997, p.79)

Based on these definitions of social capital the World Bank (1997, p.88) suggests a number of indicators of social capital, given in IS5 of Annex 4.

Table 5.4: Comparison of the Headings for Social Capital given by the OECD and World Bank

OECD (Source OECD, 2001)	**World Bank** (Source: World Bank, 1997)
Self-sufficiency	Horizontal associations
Equity	Civil and political society
Health	Social integration
Social cohesion	Legal and governance aspect

Some of the indicators of social capital listed under these themes have, in this paper, been ascribed to human capital (e.g. health and employment indicators).

The social capital headings that are proposed for this project are as follows:

Values

Trust

Equity

Social health

Social integration

Social exclusion

Social organisation

Networks, horizontal associations

Hierarchical organisations

Governance

Political arrangements

Legal and financial arrangements

The indicators under these broad headings, either taken from EC 1999, or chosen from the various indicator sets that have been identified, are given in the Social Capital table at the end of Annex 4.

5.4   The Choice of Base Indicators

Not all the indicators suggested here will be relevant for all the evaluations carried out in this project. Similarly, other indicators may suggest themselves during the individual case studies as being important to the proper evaluation of these particular SF interventions, and the effects shown by these indicators should be recorded. It is suggested, however, that the indicator Sets 1 and 2 are regarded as the core indicators for the case studies to work with. They can then be supplemented with locally relevant indicators as appropriate.

As the evaluators work with the indicators they should keep three key points in mind:

- It is necessary to consider what would have happened to the indicators in the absence of the Structural Funds. Somehow a baseline development of the indicators must be constructed, on the basis of past trends or informed judgement.

- The indicators may be broadly split into two kinds: capital stocks and the flows of benefits to which they give rise. Attempts should be made to identify both kinds of changes as comprehensively as possible. Sometimes this will only be through qualitative description, or reporting of others' perceptions, rather than through quantitative data. It is important to remember that a stock of capital should only be identified as such if it is clear that it is actually yielding a flow of benefits.

- It will often be possible to identify increases in capitals stocks (e.g. investment in training [human capital], or construction of roads [physical capital]), but the former is of no account if it does not lead to productive activity, and the latter is of no account if it does not facilitate transport. It is always necessary to give consideration in the evaluation to the flows which are presumed to derive from investments in capital, and assess whether these flows have in fact materialized.

Two approaches have been taken to generating indicator sets for this project. Each of the approaches requires that the indicators are structured in some way in respect of each kind of capital. This structure is derived below by considering the literature about the four types of the capital and the various indicators sets in these areas that have already been proposed. Then the first approach regroups the indicators from EC 1999, reproduced in Annex 3, according to the capital type on which the SF intervention has had its major effect. The indicator set that results is given in the Tables headed Set 1: Tables of Indicators for Environmental, Human, Social and Manufactured Capital, given in Annex 3. An advantage of this indicator set is that it should reflect the kind of monitoring efforts that are already being undertaken in relation to the SFs. Another advantage is that it follows as far as possible the SF intervention's chain of cause and effect from Output to Results to Impacts.

However, a disadvantage is that the indicators chosen, or the impacts covered, do not necessarily cover all the issues of interest or concern in relation to sustainable development.

A second set of indicators has therefore been chosen for each type of capital by selecting indicators (using the various indicator sets in Annex 4 as a guide), by each evaluator, for each region, to reflect the particular circumstances of the region.

6 EVALUATION TOOLS – REGIONAL AND PROGRAMME ASSESSMENT PROTOCOLS

6.1 Part A: Regional Assessment

The purpose of the regional level assessment is to identify and specify:

- The range of programmes and projects implemented in the region, now and in the past

- The key trends in relation to the four capitals and major trade-offs, and hence the SD assessment criteria for use in the impact assessment.

The aim is to define the outside column and row of the assessment matrix to be used in Part B.

6.1.1 Programmes and Projects in the Region

The first task of the evaluation is to describe the history of SF activity in the region to the present time. This includes the current programmes. In the case of the national (or sub-national) assessments reference will be made to all SF activity. The task will identify:

- programme and project names, periods, areas covered (highlight differences with NUTS 2 boundaries)

- objectives, budget allocations by Priority (noting where necessary the use of sectoral programmes that have not been regionalised in terms of budgets)

- stakeholders, management arrangements

- the existence of documentary evidence (monitoring & evaluation reports, etc).

In addition it will identify other national and regional programmes that are also being used in support of SD policy goals (and which are often used to co-finance SF measures and projects)

The selection of measures and projects for assessment will be undertaken in the light of the review of regional SD trends in the next task, as the first task of the Programme Level Assessment (Part B).

The selection of programmes and projects will include not only the regional programmes, but also sectoral programmes (where the regional focus of measures / projects can be defined) and Objective 3 measures, which are not regionally specific but which fund measures within the region. It will include all Cohesion Fund (CF) projects and Community Initiatives implemented in the region, from which a selection will be made.

A brief summary of the objectives and priorities should be summarised, highlighting any major changes in emphasis over time.

An Annex describing the history referring to relevant programmes and projects could be used if necessary.

6.1.2 Overview of Key SD Trends and Trade-offs and SD Assessment Criteria

The nature of SD trends and trade-offs will be specific to each region. It is therefore not possible to assess the contribution of the SF without first assessing the nature of regional SD. This will require recourse to a range of information and data sources in order to provide an overview, which will then form the basis of the programme assessment.

The task is to generate assessment criteria based on an overview of regional SD issues. This will be informed by a review of evidence, analysing which of the many trends are considered to be important for SD in the region and why, and what trade-offs need to be considered, and discussed with regional stakeholders. The overview will provide the justification for selected assessment criteria for use in the assessment matrix.

The following three stages form the basis of the overview and derivation of assessment criteria:

- Stage 1: Collection of Evidence

- Stage 2: Overview and Understanding

- Stage 3: Choosing the Assessment Criteria

Each element is described below.

STAGE 1: Collection of Evidence: This will be based on the following information sources, combined with discussions with regional stakeholders:

1. Review of Base Indicators

2. Review of Inter-regional Comparisons (where possible)

3. Review of Regional and National SD Assessments and Indicators

4. Review of Programme SD Criteria and Indicators

5. Review of Programme Contextual Indicators

6. Review of Programme Economy-Environment (EE) SWOT

1. Review of Base Indicators

The base indicators of regional (NUTS 2) trends in the stocks of capital and flows of services will provide a common basis for all the regional cases. By assessing comparable NUTS 1 and national data, the regional trends can be seen as part of wider trends or as something particular to the region. These indicators are discussed in the next section as an evaluation tool.

The base indicators will be defined by the evaluators. Examine the trends and discuss with regional stakeholders those that are the most significant. Explain the significance in relation to policy goals and by reference to the nature of change represented by the indicators.

2. Review of Inter-regional Comparisons (where possible)

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Based on an appreciation of a comparable (NUTS 2) region that has not been assisted, compare regional trends using the base indicators (using data provided to the evaluators). Identify any significant trends that appear to differ and explore with regional stakeholders as to the significance of these differences. Ensure that the key differences are highlighted and picked up in the overview.

3. Review of Regional and National SD Assessments and Indicators

Using available SD assessments and indicator sets at regional and national levels, compare these with the base indicators and comment on the extent of overlap and gaps. Comment on the significance of the gaps for a comprehensive assessment of regional SD. Propose relevant NUTS 2 capital indicators to fill the gaps. Also identify from available regional assessments the nature of the policy goals and issues that have driven the assessments.

4. Review of Programme SD Criteria and Indicators

Using the SD criteria specified in the latest Objective 1 or 2 Programmes, compare with the base indicators and comment on the extent of overlap, and gaps, between the criteria (and related indicators if defined) and the base indicators. Comment on the significance of the gaps for a comprehensive assessment of regional SD. Propose relevant NUTS 2 capital indicators to fill gaps. Also note the basis of the SD criteria in terms of the underpinning analysis and stakeholder involvement.

5. Review of Programme Contextual Indicators

Using available contextual Programme indicators provided by the Managing Authority, compare with the base indicators and comment on the extent of overlap and gaps. Comment on the significance of the gaps for a comprehensive assessment of regional SD. Propose relevant NUTS 2 capital indicators to fill the gaps.

6. Review of Programme Economy-Environment (EE) SWOT

Examine the SWOT analysis and identify the significant regional trends discussed, and the trade-offs between trends (explicitly or implicitly) occurring. Note any inconsistencies or gaps between the SD criteria, contextual indicators and the SWOT analysis and discuss with the Managing Authority to establish their significance. This is an important element of the evidence base and deserves full attention.

Summarise the review of evidence under the headings above (using annexes to present indicators and supporting material). Comment on the consistency of conclusions generated by the evidence. Highlight particular examples of inconsistency.

STAGE 2: Overview and Understanding: Using the review of evidence present a summary discussion of the key regional SD trends, structured and described with reference to regional policy goals and the capitals model. Include in the overview a discussion of the importance of the Programme objectives (for each of the various Programmes identified) and their relationship to overall regional policy goals. Comment on the degree of overlap or gaps and hence comment on the implied significance of the Programme objectives in overall regional goals.

The discussion should be structured around the following headings:

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1. the main policy goals of the region and their consistency with SD issues

2. the consistency of SF Programme objectives with overall regional policy goals

3. the most significant regional trends in capitals / services

4. evidence of declining capital stocks and / or services

5. the extent to which 'declines' are expected and / or planned for

6. the degree to which 'declines' are judged to be acceptable or unacceptable to stakeholders (identify significant differences in opinion) and by reference to compliance with legislative standards and impact assessment regulations

7. current or anticipated trade-offs in trends (as well as current or expected 'win-wins').

The understanding should make reference to the inter-relationships between different trends and their implications for wealth creation.

The discussion should also comment on the ability of the evidence to suggest the relative importance attached to the different trends and objectives by the regional authorities. Comment on the feasibility of attaching weights to the different objectives, as a basis for the qualitative aggregation of impacts across the different indicators.

STAGE 3: Choosing SD Assessment Criteria (Indicators and Trade-offs):
Using the overview, identify a small number of criteria that reflect the major objectives and trends considered to be significant for the sustainable development of the region. Specify and populate a set of indicators (at NUTS 2 level) that provide a measure of these criteria. Indicators should be drawn from the review of evidence, and could include indicators based on qualitative evidence. Approximately 12 indicators should be selected and organised by reference to the four capitals. Consider the possibility of attaching weights to the different indicators, based on articulated policy objectives at the regional level. If there is sufficient evidence and policy detail then define weights and clarify their justification.

In addition, identify the main two or three trade-offs (and 'win-wins') in trends in capital stocks and services, which will have the strongest influence on regional SD. Summarise these in a form that will allow a subsequent assessment of the contribution of selected SF measures.

Finally, in order to test the validity and utility of the suggested assessment criteria, assess two measures or projects in terms of their contribution to regional SD. Confirm or modify the suitability of the criteria as the basis of the Programme Assessment.

6.2 Part B: Programme Assessment

The following steps will be in large part a desk based exercise undertaken by the evaluator who will utilise programme documents, ex ante and interim and ex post evaluation studies, as well as impact monitoring undertaken by the Programme. Discussions will be required with the Managing authority and PMC in order to discuss the selected measures and projects. A checklist of the key points given below will be applied to each of the programmes:

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This part of the evaluation aims to assess the programme against its own SD criteria, as defined in Part A of the Evaluation Framework, in order to make judgements on the contribution of SF to SD. The assessment also considers the internal coherence of the Programme in relation to the horizontal priority of SD, since a low level of internal coherence implies a limited contribution to SD.

The assessment will be carried out in the following three stages:

- Stage One: Selection of measures and projects for assessment

- Stage Two: Assessing the consistency of the Programme objectives, the EE SWOT and their 'own' SD criteria

- Stage Three: The impact of measures against Programme SD criteria

6.2.1 Stage One: Selection of measures and projects for assessment

In the light of the Regional Level Assessment (Part A of the Evaluation Framework), select a series of measures and projects for the Programme Assessment. These measures will have particular significance for SD within the programme, and will form the basis of the Programme Level Assessment (Part B of the Evaluation Framework). In the case of Objective 1 and 2 Programmes (current period), it is expected that ALL measures will be considered. In the case of current Objective 3 and Cohesion Fund, it is likely that selection will be necessary. A selection of measures and projects from previous programming periods is also likely, where these have generated long term impacts relevant to SD. Selection should be guided by the need to consider those activities that have the greatest (positive or negative) effects on the SD criteria.

The selection should be justified in terms of the relevance of measures, and should be defensible against suggestions that the selection is unrepresentative of measures that might impact on the identified SD trends.

6.2.2 Stage Two: Assessing the consistency of the Programme objectives, the EE SWOT and their 'own' SD criteria

This stage examines the internal cohesion and external consistency of the objectives of current programme and large projects, based on existing documentation and discussions with the Managing Authority.

Internal Cohesion

1. Relevance of the objectives adopted compared to the EE SWOT and SD criteria

- Do the objectives in the programme match the findings of the EE SWOT? If not, why not?
- Do the SD criteria defined by the programme match the EE SWOT? If not, why not?
- Do the objectives reflect the SD criteria?

Give examples of important areas of consistency and inconsistency.

2. Changes in objectives to reflect the emergence of SD (and SD criteria) as a priority objective

- In what way have the objectives evolved over time in terms of emphasis on different types of measures or the emergence of changes in strategic objectives or priorities?
- Are the reasons for such an evolution explicit? How far are emerging SD criteria responsible?
- How has the deployment of resources between topics changed to reflect SD considerations?
- Have there been significant organisational changes?
- To what extent are such changes a consequence of policy developments relevant to SD at the national level?

3. Comparisons with the ex-ante assessment

- Does the ex-ante evaluation highlight the levels of consistency or inconsistency between the Programme objectives and SD criteria? Give examples
- Are the recommendations relevant to SD in ex ante assessments taken into account?
- If so, in what way? If not, why not?

4. The issue of dispersion /concentration of funds

- Given the importance of land use to SD, to what extent have resources been spatially focused within the region?
- What is the rationale for this concentration and to what spatial units does it relate (urban/rural areas, sub regions etc)?
- To what extent have resources been focused on particular measures or on particular beneficiary groups?

5. The implementation of the strategies on the ground

- Is the actual implementation consistent with what was planned?
- If changes took place, what was the reason for this?
- Were any such changes a consequence of a specific need for flexibility with respect to major developments and opportunities?

External Consistency

1. Comparison of programme / project objectives with regional / national SD objectives

- Do programme objectives relate to regional or national SD objectives. Give examples.
- Comment on whether there is any formal cascade of national / regional development and / or SD objectives within which the programme objectives are set. If not is there any informal cascade?

6.2.3   *Stage Three: The assessment of measures against Programme SD criteria*

This stage of the assessment will compare each selected measure and project against the SD criteria derived in Part A, noting what the expected or actual impact has been. The basis for the assessment will be Table 4.1, completed for the selected measures.

Step One: Complete the 'budget' column in Table 3.1 for the selected measures and projects, giving the % of the total programme budget for each measure.

Step Two: Discuss with programme managers the nature of the results and impacts from each measure and large projects, and how they have been achieved.

The monitoring frameworks which are used to provide interim and final evaluations of the programmes, will be used to establish the extent to which the planned outputs and impacts (or actual – when using ex-post data) contribute to SD. This will be achieved by comparing the measured outputs and impacts, with the SD criteria derived in Part A.

To understand and interpret the comparisons there will need to be careful discussion with the programme managers as to the nature of the results and impacts and how they have been achieved. This will also be important in order to review the counterfactual position and the degree to which the impacts are attributable to the programme. It is likely that the comparisons will focus on expected impacts because, where insufficient monitoring has been undertaken there will be limited evidence of actual impacts. This was a major difficulty with the programmes in the previous planning period.

Step Three: It is important to review the counterfactual position, and the degree to which to which the impacts are attributable to the programme.

Issues to consider include:

- the nature of economic and social changes in the assisted region and the extent to which particular shocks have occurred;

- the interactions between SF and other policy measures used in the region;

- the impact of a combination of measures in the region, which might bring synergies and impacts that would otherwise not have occurred. For example, if SME support measures had led to the establishment of companies which had become directly involved in the cleaning up of industrial areas, or where RTD investment had led to the creation of enterprises through two measures acting in concert, such cases would be suitable for detailed investigation;

- synergy or conflict with non-programme policies. This should pay particular attention to the use of policy measures that are currently being highlighted in the EU (and other) SD strategies. For example, how did the programmes contribute to improving markets, new investment in resource efficiency, higher levels of innovation, better communication and engagement with citizens on public policy issues – especially as a means of debating key trade-offs.

Step Four: In the light of steps two and three above, assess the relationship between each measure / project, and each SD criterion, and note in Table 3.1 whether the impact is positive ( ), negative ( ), neutral ( ) or unknown (?). In the supporting commentary highlight any significant differences in the impacts noted before and after allowing for counterfactual effects.

Step Five: Summarise the overall impact of the measures on the SD criteria.

7 EVALUATION TOOLS – PROGRAMME MANAGEMENT EVALUATION PROTOCOL

7.1 Introduction

The following questionnaire is focused on 'bottom up' programme management - that is, the institutional structures and processes at regional level used for:

- developing the programme's objectives, priorities and measures
- developing and selecting projects – the so-called 'project pipeline'
- monitoring, reporting and evaluation.

The questions therefore relate to the later stages identified in Table A2.1 on Key Decision Points.

National evaluators should complete a separate questionnaire for each current programme -
EITHER - a questionnaire for a Community Support Framework together with a separate questionnaire for each of the regional Operational Programmes;
OR - for a Single Programming Document alone;
OR - for a Community Initiative Programme.

For Community Initiative Programmes, not all the questions may be relevant since structures and procedures differ from those for 'mainstream' programmes. Evaluators should indicate on the questionnaire where and why this is so.

7.2 Programme management evaluation questionnaire

NAME OF PROGRAMME:

(*Specify Type of Programme, e.g.*: **CSF/Operational Programme/Single Programming Document/ Community Initiative Programme)**

_____

SECTION A:

DEVELOPMENT OF PROGRAMME STRATEGY, PRIORITIES AND MEASURES

A1. Extent of Partnership

1.1 Which national and/or regional Ministries/departments were actively involved in the development of the programme?

1.2 Were official
- environmental
- social (eg equal opportunities; health; social inclusion)
authorities/agencies included in the partnership? Which ones?

1.3 Which other official or non-governmental stakeholders were involved
- environmental?
- social?
- other?

1.4 At what stage in the development of the programme did they begin to participate?

1.5 For each of these authorities/agencies, please assess their influence on setting programme objectives, using the following categories:
- negligible
- significant
- extensive

1.6 Was the regional sustainable development round table (or equivalent) involved in developing the programme strategy?

1.7 Has there been a 'bending' of mainstream national and regional programmes towards SD through cofinancing or otherwise?

A2. *Ex ante* evaluation ('SWOT' analysis)

2.1 Do the terms of reference for the SWOT refer explicitly to sustainable development themes?

2.2 Please list all the official and non-governmental organisations (with their responsibilities) which participated
- formally
- as consultees
in the development of the SWOT.

2.3. At what stage in the development of the programme was the SWOT undertaken?

2.4 How far did the SWOT influence the choice of programme priorities and measures?

A3. *Ex ante* environmental assessment

3.1 Was an *ex ante* environmental or SD assessment undertaken of the programme?

3.2 By whom?

3.3 At what stage in the development of the programme?

3.4 Were stakeholders consulted? Which ones?

3.5 Were alternative priorities and/or measures assessed?

3.6 Were trade-offs between social (social and human capital), environmental (natural capital), and economic (man-made capital) impacts explicitly explored?

3.7 Were enhancing or mitigating measures considered?

3.8 Did the assessment have any impact on the definition of priorities and/or measures?

A4. Programme Targets/Indicators

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4.1   Were any environmental and social targets set *for the programme as a whole?*

4.2   What is the balance between these economic, social and environmental targets and indicators?

4.3   Were any environmental/social indicators selected *at Priority/Measure level?*

4.4   Who are the main users of these indicator sets?

4.5   Is the available data adequate to support such indicators?

4.6   Who has responsibility for monitoring against indicators?

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SECTION B

INSTITUTIONAL/MANAGEMENT STRUCTURES

(In answering questions about responsible departments, please provide details of specific units and their responsibilities, and the names of key personnel).

B1. Programme Monitoring Committee (PMC)

1.1   Which Ministry/department chairs the PMC?

1.2   Are environmental and/ or social authorities formal members of the PMC?

1.3   Which ones?

1.4   Are they also members of sub-committees (eg for each Priority)?

1.5   Are additional resources made available to these authorities to support their PMC roles eg through Technical Assistance?

B2. Mainstreaming SD in programme management

2.1   Does the Programme or Programme Complement explicitly address procedures for mainstreaming social/environment/ SD into programme management?

2.2   **EITHER:**   Is there a SD Advisory Committee?
        OR: Are there separate advisory committees for environment/equal opportunities/information technology?

2.3   Which bodies are represented on this/these committee(s)?

2.4   To whom do such committees report?

2.5   What role, if any, does it/ do they have in relation to
                    - Setting project selection criteria
                    - Selecting projects
                    - Monitoring project performance
                    - Reporting and programme evaluation?

2.6   Are there specific 'Theme Managers' appointed with responsibility for advancing environmental/ social priorities? Please provide details.

2.7   What is their role in relation to:
                    - Developing project proposals
                    - Training
                    - Guidance
                    - Project selection?

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2.8   Is Technical Assistance used to finance the appointment of Theme Managers?

2.9   What other resources are available to them?

B3.   Decentralisation

3.1   How far is responsibility devolved to *local* partnerships for

- project development?
- project selection?

3.2   Are environmental/SD authorities represented on local partnerships?

3.3   How are the extra costs of decentralisation met by environment/SD authorities?

B4.   Capacities for Integrated and Longer Term Planning

4.1   What evidence is there, that programme management has become more i ntegrated across economic, social and environmental objectives?

4.2   What evidence is there that programme management takes a longer term perspective?

SECTION C

THE PROJECT PIPELINE

C1.   Project Preparation

1.1   Has the need to commit money quickly influenced the type of projects selected – ie are existing proposals reached down 'off the shelf'?

1.2   Are project proposals invited through open calls to express interest?

1.3   Are there any

- formal
- informal

restrictions on which organisations are eligible to develop project proposals? Please give details.

1.4   Were descriptions of indicative projects which demonstrate a positive contribution to SD attached to the draft Programme?

1.5   Does the programme have a dedicated website?

1.6   Is the website used to highlight 'model' projects that make a positive contribution t to SD, and encourage similar applications?

1.7   Are there 'outreach' activities to encourage project applications which take SD themes on board? Who undertakes them?

1.8   Is training and/or written guidance given to

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- potential project promoters
- officials responsible for project appraisal

in relation to mainstreaming SD?

1.9   Do programme managers engage in formal or informal networking to exchange experience in relation to developing SD-related projects – at national or EU level?

1.10 Is Technical Assistance made available to encourage the development of innovative projects on SD themes? Please gives examples of any such projects.

C2.   Developing project selection criteria

2.1   Is national guidance available on setting project selection criteria, or do programme managers have complete discretion in setting such criteria?

2.2   Are project selection criteria transparent e.g published in the Programme Complement?

2.3   Are formal project selection criteria always used in practice – or are some projects 'fast-tracked'?

2.4   Which members of the partnership contributed to developing criteria?

2.5   Are environmental/SD considerations included in
       - core
       - measure-specific
       criteria?

2.6   Are criteria qualitative or quantitative?

2.7   If quantitative, what is the relative weighting between economic, environmental and social considerations?

2.8   Are there minimum environmental/SD thresholds that must be satisfied before projects can be approved? How stringent are these?

2.9   Does the appraisal system emphasise the need and opportunity to mitigate adverse consequences?

C3.   Project selection in practice

3.1   Is project appraisal and selection undertaken
             - centrally, by the Managing Authority or its agent(s)
             - locally, by local partnerships
             - a mixture of both?

3.2   What role, if any, is played in project selection by
             - an environmental/ SD Advisory Committee
             - an environmental/SD Theme Manager?

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3.3   Can they veto the selection of unsatisfactory projects?

3.4   Have there been any environmental appraisals of projects affecting Natura 2000 sites under Article 6.3 of the Habitats Directive? If so, please give details of outcome, and any mitigation measures.

3.5   Who undertook these assessments? Did they influence project design?

SECTION D

MONITORING, EVALUATION AND REPORTING

1.1   For individual *measures* or *projects*, are there any SD-related
- targets
- indicators?

1.2   Who is responsible for monitoring and reporting against these targets/indicators?

1.3   Does the monitoring information allow for quantitative evaluation?

1.4   In the 2001 Annual Implementation Report, are procedures to mainstream SD throughout the programme reported and assessed?

1.5   Is there any national guidance on how to evaluate the impact of the programme on SD themes for the 2003 mid-term review?

1.6   Within the Managing Authority, what evaluation capacity exists to undertake this task?

1.7   In terms of monitoring of implemented projects have the identified impacts largely been as planned? What positive or negative impacts have occurred that were not anticipated? – give examples

1.8   Does the monitoring / evaluation system allow for regional comparisons in relation to progress on SD?

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8 APPROACH TO ECONOMETRIC MODELLING

8.1 Introduction to the General Approach

A macroeconomic modelling approach has been used to assess the contribution of structural funds to sustainable development. The analysis has produced estimates of the changes in a number of indicators measuring three types of capital stocks: manufactured, human and natural. The approach does not allow estimates of the changes in Social Capital given the difficulty in identifying suitable economic variables to represent this form of capital. Following the comments from the expert group, the methodology presents an analysis that focuses on a range of variables representing different forms of capital. This represents a change on the original proposal to calculate a partial estimate of 'genuine savings'.

The approach seeks to identify components of change in capital stock with and without the Structural Funds. The modelling exercise has compared the actual economic performance of 19 sub-regions (mainly countries) in the European Union area, over the period 1986-2006, with that estimated to have occurred in the absence of the structural funds.

The existing literature together with the E3ME structure (Box 8.1) suggest following a demand side and supply side modelling approach in which investment and expenditures in education and training drives economic activity and environmental change. The demand side modelling addresses the effect structural fund expenditures have on the levels of taxes, current government expenditure, investment and the economy. The supply side modelling addresses the longer-term effects achieved by the funds via changes in productivity and changes in the accumulation of capital and technology.

Box 8.1: Outline of the Cambridge Economic Model

Coverage - The E3ME model is an E3 (Energy-Environment-Economy) model covering the European Union Member States, with Germany split into east and west, and Italy into north and south due to the structural differences in modelling these economies. The term E3 is used because the model is split into three (inter-related) modules which feed into each other, the logic being that the economy drives the demand for energy, which in turn generates emissions.

Structure - E3ME is based on an input-output model, allowing demand and supply interactions between sectors, thus capturing primary and secondary effects from an economic impact. Structural Funds would be treated as investment spending and would enter the model through two avenues; (1) as a demand-side expenditure variable – the injection of investment demand feeds into total demand, which will generate employment, import demand, and other secondary effects before a new stable model solution is arrived at. The model solves for all sectors simultaneously through the IO structure for each of its regions, allowing a consistent treatment of the demand-side nature of the SF impact. (2) as a supply-side indicator of technological progress. Investment also forms a large part of a technological progress variable, used in the model as a proxy for the human/physical capital stock. This has effects elsewhere in the model, affecting domestic prices, export competitiveness, and the output-employment relationships. The technological progress variable also has an impact on energy demand through improved efficiency of use, and hence onto the intensity of emissions.

Solution - E3ME is an econometric model, implying that historical trends are an important feature in determining future outcomes. The model is suitable for counter-factual analysis and has been used as such for a number of projects by the EC, including investigation of the effects of the Single Market .To measure the effects generated by investment funded under the SF a counter-factual would be developed to look at what might have happened had the investment

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not taken place, or the funds had been used elsewhere in the economy. Comparison with actual data (ie with the SF effects) would then yield information on the effects on various economic, energy, and environmental indicators used in the field of SD.

More information on the workings of the E3ME Model and related publications can be obtained from the CE website. http://www.camecon.com/e3me/index.htm

8.2   The Counterfactual Position

To model the effect of a 'no SF' scenario requires the assessment of two elements related to the SF expenditure:

1)   the reduced level of taxes equal to the estimated Member States contributions to the EU share of the Structural Funds. The reduction in each Member State is calculated in proportion to each Member State's total contribution to the EU;

2)   the reduced level of investment in physical capital due to the reduction in EU SF contribution. The reduction in demand due to less investment in physical capital is modelled through a reduction of public administration investment. The supply component of the reduction is assumed to negatively effect productivity of tradable goods[1]. Annex 6, Volume 1 presents time series for the expenditure in physical capital foregone;

3)   the reduced level of investment in education due to the reduction in EU SF contribution. The reduction in demand due to less education expenditure is modelled through a reduction of government current expenditure. The supply component that arises from this reduction is also assumed to affect negatively productivity of tradable goods[2]. Annex 6 Volume 1 presents time series for the total structural fund expenditures (physical capital and current expenditures).

The impact at the level of the EU15 will therefore result from the balance of these sets of assumptions (how the money invested is raised and spent). At the level of the MS the impact is also a reflection of the net transfer of resources to or from the SF.

8.3   Definitions of Indicators

The variables to be presented are a selection from the Commission previous work on structural indicators (European Commission, 2001) and other E3ME outputs. The structural indicators are macroeconomic variables designed to cover a range of areas which the Commission deems important.

The selection of variables is limited by the scope of the project and to those indicators that are capable of being produced by E3ME as model outputs. The indicators are constructed by splicing together a set of similar variables from the E3ME model to those available from Eurostat. This is to account for differences between E3ME indicators and their equivalent presented by the Commission. The forecast values will be taken from the baseline projection.

The selected indicators are:

Manufactured Capital

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[1] This is somewhat similar to the approach in the HERMIN study (See Bradley 2001). In E3ME the reduction of supply is assumed to be absorbed by trade.
[2] Similar to the HERMIN approach (Bradley 2001).

- Gross domestic fixed capital formation, by broad economic sector

- Gross value added (GVA), by broad economic sector

- Investment in 'knowledge / ICT' sectors

- Share of exports of high-tech products in total exports

Human Capital

- Real unit of labour cost

- Employed persons aged 15-64 as a share of the total population aged 15-64 (and/or levels)

- Labour productivity. GDP per person employed (EU15=100)

- Total public expenditure on education as a percentage of GDP

- Business enterprise expenditure on R&D

Natural Capital

- Greenhouse gases (GHG), by individual pollutants

- Acid gases, by individual pollutants

- Energy intensity. Gross inland consumption of energy) per unit GDP (kilogram of oil equivalent)

8.4 Overview of the Methodology

8.4.1 Macroeconomic modelling approach to assess structural funds performance

There has been in the past a number of studies attempting to measure the effects that the community support framework has on economic activity. Such studies have tackled the short and long-term consequences of the investments while they have focused on specific programmes, countries or specific time periods.

For example the Thanet Objective 2 Evaluation carried out by Cambridge Econometrics (CE 1997) that implemented a short and long-term impact assessment of the support framework in this UK community. The study used demand multipliers in combination with supply side effects to measure the SF induced level of activity. Higher levels of investment depended on the size of fund, type of capital funded (human or physical) and sectors targeted. In addition, induced productivity gains that raised output and employment were implemented.

Another more recent work is the Impact of Community Support Framework on Objective 1 countries using the HERMIN model (See Bradley 2000) that estimated changes in economic activity levels for: Greece, Ireland, Portugal and Spain. Using estimates for the stock of capital and stock of education, the study implemented output externalities for manufacturing/traded sectors coming about through firm location. Factor productivity externalities arising from training and transport and communication infrastructure were also implemented in that study.

The Ernst & Young ex-post analysis of 1989-93 Objective 2 programme by programme analysis (Ernst & Young 2001) estimated employment creation by the funds, the number of people trained by the funds and the number of SMEs assisted by the funds. In an accounting fashion costs per job, per trainee and per assisted SME were estimated from total fund expenditure.

For the present programme period, Beutel's 2000 - 2006 evaluation objective 1 analyses projected expenditure for East Germany, Greece, Spain, Ireland, the Italian Mezzogiorno and Portugal. The methodology used in that study was based on short-term assessments of previous programmes and a dynamic input-output model based on investment multiplier-accelerator. In addition, the study measures effects on final demand and long-term effects on capital and labour, output and productivity

In the present approach, a more comprehensive European and programme level is implemented. On the one hand we study a longer period (1986-2006) of community contribution that covers a number of programmes and objectives. At the same time the use of E3ME allows to study the effect of structural fund in each national economy but also considering the across-the-border effects whiting Europe.

Finally, the present work concentrates not so much on the effect on economic activity but on a number of capital indicators in an attempt to study the sustainability component of the economic activity generated by the funds.

8.4.2   The E3ME model

This part of the study is an attempt to measure the macroeconomic effects of European SF on sustainable development by using E3ME, the Cambridge Econometrics general Energy-Environment-Economy Model for Europe. This modelling exercise generates scenarios that enable comparisons between the actual economic performance of the 19 sub-regions and the hypothetical no-EC-contribution to structural funds situation.

E3ME (a general Energy-Environment-Economy Model for Europe) is a general model for Europe capable of addressing issues that link developments and policies in the areas of energy, the environment and the economy. The model provides a framework for evaluating different policies and particularly those aimed at achieving sustainable energy use over the long term. For example, the model has contributed to the evaluation of policies to reduce anthropogenic emissions of greenhouse gases in Europe by 60% over the next 50 years.

The existing literature together with the E3ME structure suggest following a demand side and supply side modelling approach in which investment by country and by sector drives economic activity and environmental change.

8.4.3   Use of E3ME outputs to generate indicators of capital change

Although, E3ME can provide measurements for physical investment and its prices through time, the model does not provide values for the prices of human capital, natural capital and pollution. Nevertheless, the emissions sub-model calculates time series for the levels of air pollution generated from end-use of different fuels and from primary use of fuels in the energy industries themselves, particularly electricity generation. CO_2 has been modelled in E3ME from the outset. In addition, the emissions modelling has been extended to include many other

atmospheric emissions so that the results can include the effects on non-CO2 green house gases.

Investment in human capital and other types of capital can be approximated by other outputs in E3ME. Some of these indicators can be readily obtained from the current version of the model while others could use existing model variables as a proxy. In particular, the changes in air quality through levels of gas emission can be obtained directly from the model outputs. Changes in value of the net capital stock can be approximated by fixed investment. The changes in human capital stock can be modelled through other E3ME variables, expenditure in the education sector and investment in research and development.

Given the country and sectoral disaggregation (regional in some cases) of the model it is relatively easy to measure the changes in these indicators. For example, there is direct access to changes in government expenditure in education. Total physical investment for the 19 regions are outputs directly available from any model run.

Other indexes requested such as: 'Knowledge / ICT' investment share, 'High tech' products export share, real unit of labour cost, employment share of population, labour productivity, public expenditure in education, and Energy efficiency can be calculated directly from other E3ME outputs.

8.4.4 Data and model interventions

The modelling work requires a series of data and model interventions in order to create scenarios suitable to assess the impact of the community contribution to the structural funds on the chosen indicators.

The counterfactual is a scenario that excludes all expenditures made with EC funds. This means that both matching national and private contributions are assumed to remain unchanged, with the consequent caveats as discussed in section 8.2. The actual measure of the counterfactual, in terms of investment expenditures, is obtained using a description of the structural expenditures by form of intervention together with an assumption on how the money might otherwise have been risen or spent. As a consequence of the reduced level of contribution to the funds, an equivalent reduced level of taxes by Member States was implemented. The reduction in each Member State was maintained proportional to each Member State's total contribution to the European government. The period under consideration is 1986 to 2006 that covers three main programme periods: 1986 to 1993, 1994 to 1999 and 2000 to 2006.

A calibrated run of the model was obtained under the baseline assumptions, i.e. the actual level of investment that includes the community contribution to structural funds. This run is compared with an endogenous run where the levels of sectoral investment are fixed at the (lower) levels determined by the counterfactual. This comparison produced time series for the expected the chosen indicators including, air pollution, government education expenditure, investment, etc.

The following sections discuss the macroeconomic features of E3ME and the chosen demand and supply approach. This approach enabled the scenario analysis to incorporate the long-term and dynamic effects that arise from to the changes in taxes, investment and current expenditures.

8.4.5 Long term analysis using E3ME

Most conventional macroeconomic models which are operational in government describe short and medium-term economic consequences of policies but with a limited treatment of long-term effects, such as those from the supply side of the labour market. This puts a limit on their ability to analyse long-term policies. E3ME combines the features of an annual short- and medium-term sectoral model estimated by formal econometric methods with the detail and some of the methods of the CGE models, providing analysis of the movement of the long-term outcomes for key E3 indicators in response to policy changes. It is essentially a dynamic simulation model estimated by econometric methods. This is key feature in the present research that allows assessing the long-term effects of the structural funds investment.

8.4.6 Regional and industrial representation in E3ME

E3ME is a detailed model of over 40 sectors, compatible with ESA95 accounting classifications, and with the disaggregation of energy and environment industries, in which the energy-environment-economy interactions are central. The model is designed to be estimated and solved for 19 regions of Europe chosen for the project (the EU-15 member states plus Norway and Switzerland, with Germany divided into east and west and Italy divided into north and south), although eastern Germany is excluded from the econometric estimation.

The model comprises:

- the accounting balances for commodities from input-output tables, for energy carriers from energy balances and for institutional incomes and expenditures from the national accounts

- environmental emission flows

- 22 sets of time-series econometric equations (aggregate energy demands, fuel substitution equations for coal, heavy oil, gas and electricity, intra-EU and extra-EU commodity exports and imports, total consumers' expenditure, disaggregated consumers' expenditure, industrial fixed investment, industrial employment, industrial hours worked, labour participation, industrial prices, export and import prices, industrial wage rates, residual incomes, investment in dwellings, and normal output equations).

8.4.7 Fixed Investment in E3ME

Investment is an important but volatile component of effective demand and its treatment in the model is critical to model simulation and forecasting performance. Ideally, in a sectoral model such as E3ME investment should be disaggregated by asset (eg vehicles, plant and machinery, and buildings and work) as well as by investing industry, but this has not proved possible in the past due to data limitations.

The specification of the investment equations in E3ME has built upon earlier work published in Barker and Peterson (1987). The theory behind the choice of variables that explain the long-run path of investment is a mixture of the neo-classical tradition, whereby factor demands are explained solely in terms of other factor prices, and the accelerator model, which recognises the importance of output as a determining influence.

For a dynamic representation of the model other variables are added including the real rate of interest and the ratio of actual to normal output, the latter being designed to capture the decision to invest for increased capacity, as opposed to solely for replacement needs.

Given that dwellings is a big component of investment it was felt that the industrial investment equation was inadequate in explaining the investment in dwellings and should be treated separately due to the different factors driving the decision-making process. For the long-run equation the demand for housing will expect to have a positive relationship with the real gross disposable income. Since most of the housing market is financed through borrowing, e.g. mortgages, the demand for housing also seems likely to be sensitive to variations in the real rate of interest. Variables covering child and old-age dependency rates are included to capture changes in investment in dwellings caused by changing demography. For the dynamic equation the unemployment rate is included, to capture the variation in the labour market, as well as the total consumer price deflator.

The output-investment loop includes industrial demand for goods and services and runs from total demand to output and then to investment and back to total demand (see Figure 8.1 below). For each region, total demand for the gross output of goods and services are formed from industrial demand, consumers' expenditure, government demand, investment (fixed domestic capital formation and stockbuilding) and exports. These totals are divided between imports and output depending on relative prices, levels of activity and utilisation of capacity. Industrial demand represents the inputs of goods and services from other industries required for current production, and is calculated using input-output coefficients. EUROSTAT input-output tables have been obtained to give 1995 estimates for the 15 EU Member States. The coefficients are calculated as inputs of commodities from whatever source, including imports, per unit of gross industrial output.

Forecast changes in output are important determinants of investment in the model. Investment in new equipment and new buildings are one of the ways that companies adjust to the new challenges introduced by energy and environmental policies, so the quality of the data and the way it is modelled are of great importance to the performance of the whole model.

Figure 8.1: E3ME 3.0 Output-Investment loop
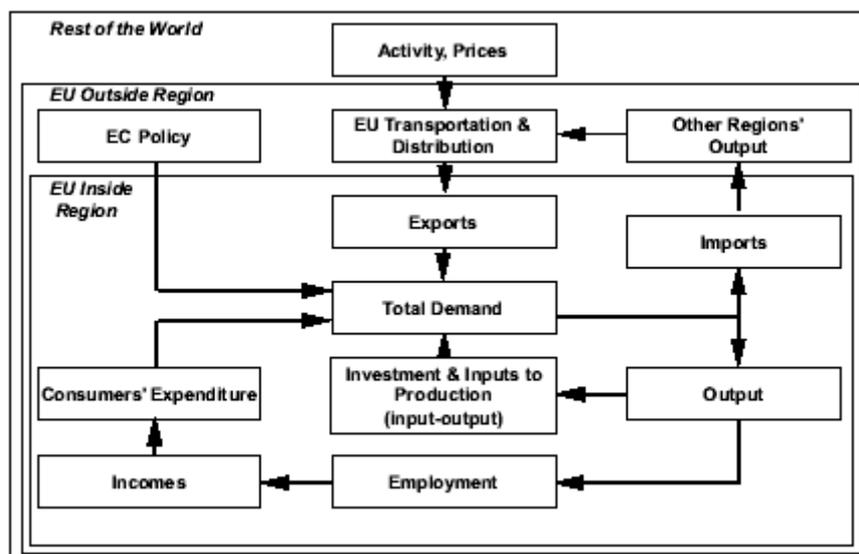
Regional investment by investing industry is determined in the model as inter-temporal choices depending on capacity output and investment prices. When investment by user industry is determined, it is converted, using coefficients derived from input-output tables, into demands on the industries producing the investment goods and services, mainly engineering and construction. These demands then constitute one of the components of total demand. Gross fixed investment, enhanced by R&D expenditure in constant prices, is accumulated to provide a measure of the technological capital stock. There are problems with the usual definition of the capital stock (see Scott, 1989), partly because there are no satisfactory data on economic scrapping. The accumulation measure is designed to get round the worst of these problems. Investment is central to the determination of long-term growth and the model embodies a theory of endogenous growth, which underlies the long-term behaviour of the trade and employment equations.

8.4.8   Supply and Demand side modelling

The community contribution to structural funds modifies the E3ME solution via two effects. The short-term demand and the long-term supply side.

Demand side effects address the direct effects of structural fund investment in government expenditure in infrastructure, physical capital, education and other current expenditure. Given that investment is mostly treated through the inclusion of 41 sectoral investments, structural funds have the effect of changing the distribution of investment among these sectors. In particular, some of these industries can be seen as directly or indirectly affected by the programmes, for example education, health services, transport industries and dwellings. On the other hand, the short-term effect of lower VAT rates channels through increased level of activity from higher disposable income.

The supply side analysis addresses the effects of accumulation of physical and human capital their interaction with other E3ME relationships. Using long-term output-capital elasticities taken from the literature, the production of tradable goods has been adjusted to a higher level of productivity that arises from the accumulated expenditures in manufactured and human capital. We assume that the increased level of output is absorbed by exports and this knocks on the production chain increasing overall production.

8.5   References

Beutel (2002) 'The economic impact of the objective 1 interventions for the period 2000-2006', *European Commission Report*, Kontanz, Germany, May.

Bradley (2000) 'The impact of the community Support Frameworks on Objective 1 countries: Greece, Ireland, Portugal and Spain 1989-2006', *Working Paper Economic & Social Research Institute*, Dublin, October.

Bradley J., Coimbra R., Modesto L., Neves P. D. and O'Donnell N. (1995) "The effect of the CSF 1994-99 on the Irish and Portuguese Economies: An analysis based on the HERMIN model." *Working Paper Economic & Social Research Institute,* Dublin.

Brettell, S. and Barker, A. (1996) 'Using a Model-Based Forecasting Approach to Evaluate Regeneration Funding in Local Areas of the UK', *Cambridge Econometrics Working Paper*, January.

CE (1994) 'Merseyside Objective 1 Status: Economic Analysis', *Report to Merseyside Task Force and partners*, March.

CE (1997) 'Economic Evaluation of Thanet Objective 2 Area', *Report to the Office of the South East and Thanet District Council*, June.

CE (2002) *E3ME manual, Version 3.0*, Cambridge Econometrics, Cambridge.

EC (2000a). 'Communication from the Commission: Structural Indicators', COM (2000) 594 final.

EC (2000b) '11th Annual Report on the Structural Funds', *Report from the Commission*, Comm(2000)698 final, Volume 1, Brussels.

EC (2001b) 'Allocation of 2000 EU operating expenditure by Member State', *Outlook for Financing and Budget forecasts of Own Resources*, Brussels, September

EC (2001c) 'Twelfth Annual Report on the Structural Funds'(2000), *Report from the Commission*, Comm(2001)539 final, Brussels.

Ernst & Young (1999) 'Ex-post Evaluation of the 1989-1993 Objective 2 programmes', *Synthesis Report*.

Hamilton, K. (2000) 'Genuine Saving as a Sustainability Indicator', *Environmental Economic Series*, paper No77, The World Bank, Washington.

Lee, K, M H Pesaran and R G Pierse (1990) 'Aggregation Bias in Labour Demand Equations for the UK Economy' Chapter 6 in Barker, T and M H Pesaran (eds) *Disaggregation in Econometric Modelling*, Routledge.

OECD (2001) *Sustainable Development: Critical Issues*, OECD, Paris, June. OECD Code 032001031P1.

GLOSSARY

Assets	(see Capital Stocks)
Base Indicators	These are indicators of regional or national level changes in the social, economic and environmental context within which SF programmes operate. For the purposes of this project, base indicators will be provided in the context of the four capitals model, and will measure either capital stocks, or flows of related services, that contribute to human welfare (as defined by agreed policy objectives).
Candidate Countries	The countries of central and eastern Europe that have applied to become members of the European Union. In 1998, negotiations opened with six countries, which form the 'first wave' of applicant countries: Cyprus, the Czech Republic, Estonia, Hungary, Poland, and Slovenia. A 'second wave' will be made up of Bulgaria, Latvia, Lithuania, Romania, Slovakia and Malta.
Capital Stocks	Capital stocks provide a flow of income and other services to society. A depreciation (or reduction) in the stock of capital reduces the subsequent flow of services. Different capital stocks have been defined that provide different services. Four types of capital are generally defined: Economic (or human-made or manufactured) capital, Environmental (or natural) capital. Human capital, and Social capital. Note that investment in stocks does not automatically give rise to productive activity, rather the potential for productive activity, eg investment in training (human capital) requires employment opportunities in which to apply new skills. New infrastructure has to be used.
Contextual Indicators	For the purposes of this project, these are the indicators that the programme has defined itself, as being relevant to the social; economic and environmental context within which the SF programmes operate.
Economic Capital	Economic capital comprises human made or produced assets that are used to produce other goods and services. Some examples are machines, tools, buildings, and infrastructure.
Environmental Capital	(see Natural Capital)
Human Capital	Human capital generally refers to the health, well-being, and productivity potential of individual people. Types of human capital include *mental and physical health, education, motivation* and *work skills*.
Human-made Capital	(see Economic Capital)
Managing Authority (MA)	In operation since 2000, the body designated by the Member State to manage the programme.
Natural Capital	Natural capital comprises the stock of natural resources linked directly or indirectly with human welfare. Natural resources

comprise ecosystems and biodiversity that provide natural services, e.g. drinking and bathing water, energy, minerals, timber, air and water filtration,

Objective 1	The first EU regional policy Objective, which aims to promote the development and structural adjustment of regions whose development is lagging behind.
Objective 2	The second EU regional policy Objective, which aims to support the economic and social conversion of areas facing structural difficulties: industrial areas, rural area, urban areas, and areas dependent on the fishing industry.
Objective 3	The third EU regional policy Objective, which aims to support the adaptation and modernisation of education, training and employment policies and systems.
Performance Indicators	These are specified by the individual Programme Monitoring Committee (PMC) in order to measure the inputs, results, outputs and impacts of SF programmes.
Programme Monitoring Committee (PMC)	Committee set up by the Member State and the managing authority to ensure the quality and effectiveness of programme implementation.
Project Pipeline	The flow of projects that is generated by promoters and sponsors which may come forward for possible SF programme funding.
Project Selection Criteria	These are criteria set by the MA and PMC to guide project promoters and sponsors as to the acceptable design and operation of possible projects for programme funding. These criteria are set by reference to the objectives and priorities of the programme, but also SF guidance in relation to horizontal priorities such as SD.
Services	The flow of attributes provided by capital stocks, necessary to meet human needs (food, shelter, clothing, society) and to increase human welfare
Social Capital	Social capital, like human capital, is related to human well-being, but on a societal rather than individual level. It consists of the social networks that support an efficient, cohesive society, and facilitate social and intellectual interactions among its members. Social capital refers to those stocks of social trust, norms and networks that people can draw upon to solve common problems and create social cohesion. Examples of social capital include neighbourhood associations, civic organisations, and co-operatives. The *political and legal structures* which promote political stability, democracy, government efficiency, and social justice (all of which are good for productivity as well as being desirable in themselves) are also part of social capital.
Strong Sustainability	Strong sustainability requires that the quantity of each type of capital is preserved independently, i.e., the different types of capital can complement, but not substitute one another.

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Structural Funds	The financial instruments with which the European Union implements its structural policies. There are four Structural Funds: ERDF, ESF, EAGGF-Guidance, and since 2000, the Financial Instrument for Fisheries Guidance (FIFG). The EU's structural policies are also implemented through the Cohesion Fund (not a SF) and through loans from the EIB.
Substitution of Capital	The use (reduction) of one capital to increase another capital. The desirability of substitution is debated, but the existence and extent of substitution can be examined empirically
Sustainable Development	Non-declining *total* capital stocks over time
Sustainable Development Criteria	These are specified by the PMC as the basis for assessing the performance of the programme against the horizontal priority of SD. These criteria will represent the normative interpretation of SD by the PMC which may or may not fit with the capitals model.
Weak Sustainability	Weak sustainability preserves total capital, but not necessarily each of the four kinds of capital. i.e., the different types of capital are viewed as substitutable for one another. Making this concept operational requires that the different types of capital are expressed in the same unit, usually money.

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REFERENCES

EC (European Commission) 1999 'Indicators for Monitoring and Evaluation: an Indicative Methodology', Working Paper 3 in 'The New Programming Period: 2000-2006: Methodological Working Papers, EC, Brussels, available on
http://europa.eu.int/comm/regional_policy/sources/docoffic/working/doc/indic_en.pdf

ECOTEC 1999 *The Thematic Evaluation of the Impact of the Structural Funds on the Environment*, Report to DGXVI of the European Commission,Vol.1, ECOTEC, Birmingham

OECD (Organisation for Economic Co-operation and Development) 2001 *The Well-Being of Nations: the Role of Human and Social Capital*, OECD, Paris

Putnam, R. 2000 *Bowling Alone: The Collapse and Revival of American Community*, Simon Schuster, New York

World Bank 1997 *Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development*, Environmentally Sustainable Development Studies and Monographs No.17, World Bank, Washington DC

World Bank 2000 'Genuine Saving as a Sustainability Indicator' by Kirk Hamilton, Paper No. 77, Environmental Economics Series, World Bank, Washington DC, available on http://www-esd.worldbank.org/eei/

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ANNEX 1: THE FOUR CAPITALS MODEL

The Concept of Capital

The concept of capital derives from economics, where it is used to signify any stock or asset from which a flow of benefits derives. In its narrowest interpretation capital is used to mean manufactured goods which themselves produce, or facilitate the production of, other goods and services. This kind of capital is referred to below as 'manufactured capital'.

However, it is clear that flows of benefits derive from many other sources than manufactured capital. In conventional capital markets increasing attention is being paid to 'intangible' forms of capital which may affect the valuation of firms. These intangibles include brands, reputation and the intellectual quality of the workforce. In some knowledge and service companies intangibles can account for the greater part of company worth.

In economics too the concept of capital has been extended in a number of directions, to take into account the quality (as opposed to the quantity) of labour (human capital), the networks through which labour is organised and which create the social context for economic activity (social/organisational capital), and the natural resources and environment which both provide inputs into the economic process and maintain the existence of life on earth (natural capital). These are the four types of capital - manufactured, human, social and natural - which will be considered in this evaluation, and which are discussed further below.

All kinds of capital can only be identified as such from the flows of benefits to which they give rise. Where these benefits can be given a money value, then the value of the capital stock from which they derive is simply the net present value of the benefit flow over time. The benefits are no less real if they cannot be so valued, but obviously in this case the capital stock that gives rise to them will need to be described, and perhaps quantified, in a different way. There are many examples of benefits, and therefore of capital stocks (especially social and natural), which it is difficult or impossible to give a money value to. Care is required to ensure that these benefits and associated capital stocks are given due weight despite these measurement difficulties.

The flow of benefits from the capital stock implies a production process, in which the capitals may be combined. The next section characterises this process, and the four capital stocks, in more detail.

A Four-Capital Model of Wealth Creation

Figure A.1 illustrates a four-capital model of wealth creation which was first put forward in Ekins 1992 (pp.147-151) and elaborated further in Ekins 2000 (pp. 51ff.), from which the following description is largely taken. The same model seems to have commended itself to Serageldin & Steer (1994, p.30) of the World Bank, who write of the "need to recognise at least four categories of capital", defined as in Figure A.1.

Figure 1 portrays four kinds of capital stock: ecological (or natural) capital, human capital, social and organisational capital, and manufactured capital. Each of these stocks produces a flow of 'services' from the environment (E), from human capital (L), from social/organisational capital (S), and from physical capital (K), services which serve as inputs into the productive process, along with 'intermediate inputs' (M), which are previous outputs from the economy which are used as inputs in a subsequent process.

Figure A.1: A Four-Capital Model of Wealth Creation through a Process of Production
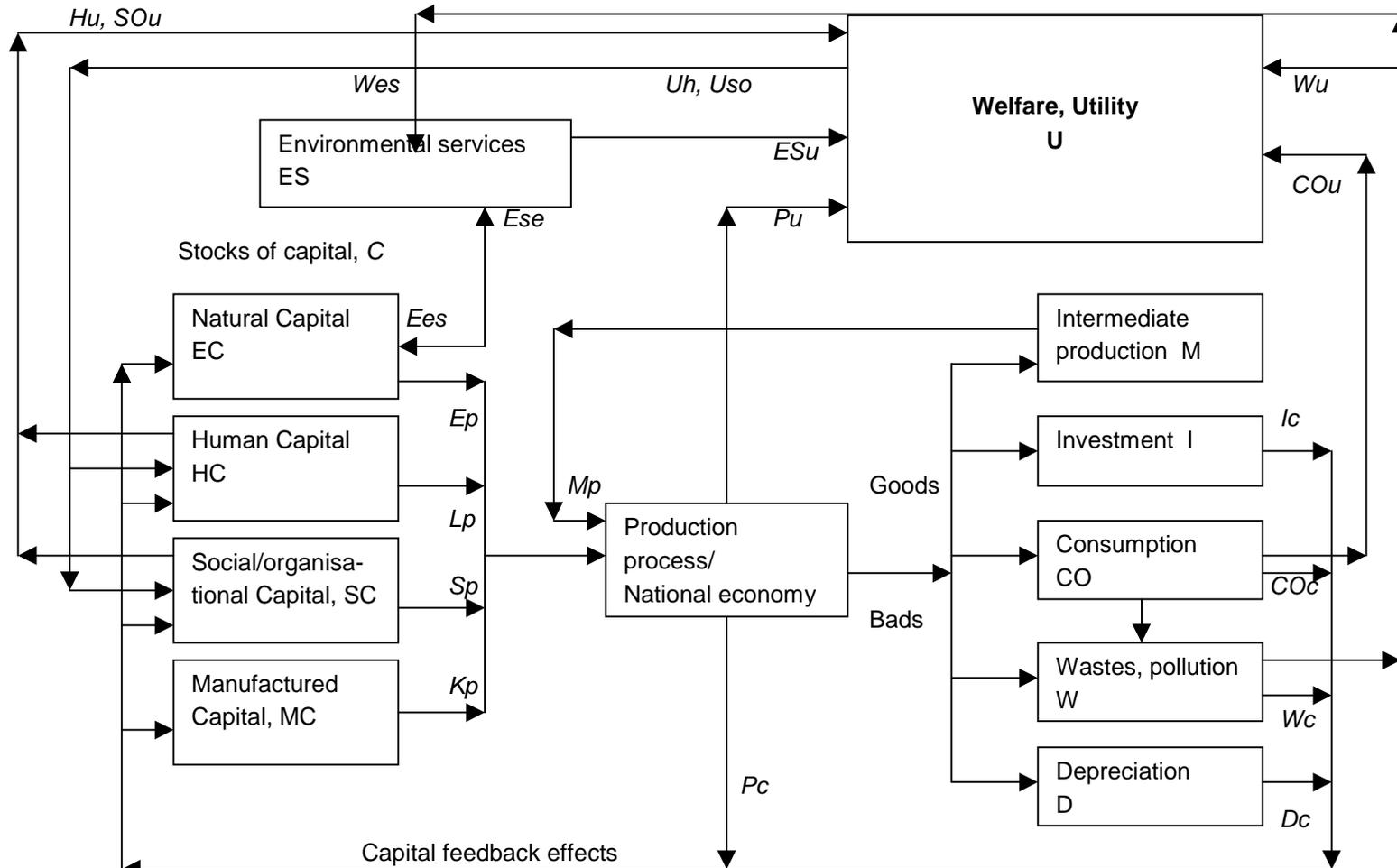
Note: In the flow descriptors, the upper case letters denote the source of the flow, lower case letters denote the destination. Those relating to the various capital stocks have the C omitted for simplicity.

Manufactured capital comprises material goods - tools, machines, buildings, infrastructure - which contribute to the production process but do not become embodied in the output and, usually, are 'consumed' in a period of time longer than a year. Intermediate goods, in contrast, either are embodied in produced goods (e.g. metals, plastics, components) or are immediately consumed in the production process (e.g. fuels). Human capital comprises all individuals' capacities for work; while social and organisational capital comprises the networks and organisations through which the contributions of individuals are mobilised and coordinated, and the shared norms, values and understandings which underpin their operation.

Ecological capital is a complex category which performs three distinct types of environmental function (as categorised by Pearce & Turner, 1990 pp.35ff.), two of which are directly relevant to the production process. The first is the provision of resources for production (E), the raw materials that become food, fuels, metals, timber, etc. The second is the absorption of wastes (W) from production, both from the production process and from the disposal of consumption goods. Where these wastes add to or improve the stock of ecological capital (e.g. through recycling or fertilisation of soil by livestock), they can be regarded as investment in such capital. More frequently, where they destroy, pollute or erode, with consequent negative impacts on the ecological, human or manufactured capital stocks, they can be regarded as agents of negative investment, depreciation or capital consumption. Either way, the wastes contribute to the capital feedback effects identified in Figure A.1 (Wc).

The third type of environmental function does not contribute directly to production, but in many ways it is the most important type because it provides the basic context and conditions within which production is possible at all. It comprises basic 'environmental services' (ES), including 'survival services' such as those producing climate and ecosystem stability, shielding of ultraviolet radiation by the ozone layer, and 'amenity services' such as the beauty of wilderness and other natural areas. These services are produced directly by ecological capital independently of human activity, but human activity can certainly have an (often negative) effect on the responsible capital and therefore on the services produced by it, through the capital feedback effects discussed earlier.

The outputs of the economic process can therefore, in the first instance, be categorised as 'Goods' and 'Bads'. The Goods are the desired outputs of the process, as well as any positive externalities (incidental effects) that may be associated with it. These Goods can be divided in turn into consumption, investment and intermediate goods and services. The Bads are the negative effects of the production process, including capital depreciation and polluting wastes and other negative externalities, which contribute to environmental destruction, negative effects on human health etc. Insofar as they have an effect on the capital stocks, the Bads can be regarded as negative investment.

The necessity for a matter/energy balance on either side of the production process means that all matter and energy that feature as inputs must also emerge as outputs, either embodied in the Goods or among the Bads. On disposal of the former, therefore, all these former inputs are returned to the environment, to the stock of ecological capital, where they may have a positive, negative or neutral effect. The essential point is that, for matter, Figure A.1 represents a closed system; for energy, inputs can be received from the sun, and heat can be radiated from the earth into space.

Some of the feedback processes in Figure A.1 are as follows:

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- Investment represents an addition to the capital stock (Ic), while depreciation of capital goods (Dc) or consumer durables (COc) reduces it.

- Wastes and pollution from the production process and consumption affect utility directly (Wu, e.g. litter, noise) and through their mainly negative feedback into the stocks of environmental, human and manufactured capital. These feedbacks, Wc, can reduce the productivity of environmental resources (e.g. through pollution) and affect the ecological capital that produces environmental services (e.g. by engendering climate change or damaging the ozone layer); they can damage human capital by engendering ill health; and they can corrode buildings (manufactured capital). They can also affect environmental services directly (Wes, e.g. by reducing the beauty of natural areas).

- Labour is the service delivered by an expanded concept of human capital, the formation of which Becker (1964, p.1) defined as "activities which influence future monetary and psychic income by increasing the resources in people". Human capital can therefore be seen to include such aspects of labour-power as knowledge, skills, health and motivation. Specifying human capital thus allows the model to recognise the direct relationships between human capital and welfare: a happy worker will be more productive (Uh); and a healthy worker will be happier as well as more productive (Hu).

- The concept of social/organisational capital reflects the considerable part played by institutions in wealth creation. The concept was first developed by Tomer (1973, pp.267-281), and considerably expanded in his book Organisational Capital (Tomer 1987). Whereas human capital is embodied in individuals, social/organisational capital derives from their ways of interacting. As with human capital, social/organisational capital has a direct relationship with welfare. Social structures (e.g. the family) are major determinants of welfare (SOu), while the welfare of individuals will affect the performance of social structures (Uso).

- It may be seen from Figure 1 that utility is perceived as being generated by many other aspects of life apart from consumption. Broadly these can be classified according to the four modes of experience identified by Max-Neef (1991, pp.30ff.):

  Being: affected by the quality of the environment (ESu), the nature and level of wastes (Wu), and the quality of human capital itself (Hu);

  Having: derived from consumption (COu);

  Doing: derived from the work process (Pu);

  Interacting: derived from social and organisational structures as well as from the work process (SOu).

- There is a joint relationship between the stock of ecological capital (EC) and the environmental services (ES) deriving from it. In a stable ecosystem, EC and ES will tend to be symbiotically balanced.

- There is an important feedback from the work process to the human and social organisational capital stocks (Pc), reflected in the identification of such effects as 'learning by doing' (Arrow 1962) and in the perception that work can 'deskill' workers (Braverman 1974).

The complexity of Figure A.1 is a disadvantage in terms of its tractability for formal analysis. However, more tractable models have undesirable limitations in their physical interpretation. It seems that the multiple feedbacks of Figure A.1 are necessary for an adequate description of how the four capitals are combined in a production process and if their contribution to wealth creation and welfare is to be understood. In the first instance, at any rate, the evaluation of the SFs will need to be applied using the full model in order to be sure not to miss any important effects simply because they are not reflected in more conventional evaluation and accounting systems.

ANNEX 2 : POINTS AT WHICH SD GUIDANCE MIGHT BE APPLIED

1.   DECISION BY THE EUROPEAN COUNCIL

On 24 and 25 March 1999, the European Council in Berlin reached political agreement on the "Agenda 2000" package, including the draft regulations governing the Structural Funds for the period 2000-2006. This included eligibility criteria for the re-defined regional policy Objectives (1, 2 and 3).

Eligibility criteria:

Objective 1: NUTS II regions whose per capita Gross Domestic Product (GDP) is less than 75% of the EU average (unchanged criteria).

Objective 2: There are four types of area eligible for support under the 'new' Objective 2:

> **1. Industrial areas**: Eligible areas belong to NUTS level III regions. Eligibility is linked to three conditions:

- An unemployment rate above the Community average;
- A percentage share of industrial employment exceeding the Community average; and
- A decline in this employment category.

> **2. Rural areas**: Eligible areas belong to NUTS level III regions, and must satisfy two of the following four linked criteria:

- A population density of less than 100 people per km^2 or a proportion of employment in the agricultural sector which is at least double the Community average;
- An average unemployment rate which is above the Community average or a decline in population.

> **3. Urban areas**: These areas must meet at least one of the following criteria:

- A rate of long-term unemployment higher than the Community average;
- A high level of poverty, including poor housing conditions;
- Particularly acute environmental problems;
- A high crime rate;
- A low level of education among the population.

> **4. Areas dependent upon the fishing industry**. Eligibility criteria: a significant share of employment in the fisheries sector and restructuring problems resulting in a significant decline in employment in this sector.

The regulations state that Objective 2 should cover no more than 18% of the Community population. An indicative breakdown was defined as follows: industrial areas (10%), rural areas (5%), urban areas (2%) and areas dependent on the fishing industry (1%).   The following system was used to finalise the list of eligible areas:

- The Commission used a series of objective criteria to establish population ceilings for coverage in each Member States, identifying the priority regions at Community level at

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the same time.

- Within the limits of the fixed ceilings, the Member States submitted to the Commission a list of areas they believed met the eligibility criteria based on appropriate statistical information in line with the regulations.
- Following these submissions, the Commission drew up a list of eligible Objective 2 regions in each Member State, in close co-operation with the Member State concerned, and with due regard for national priorities.

Objective 3: Objective 3 funding is available in all areas except those covered by Objective 1.

The total Structural Fund allocation for the period 2000-2006 was fixed at 195 billion euros, 69.7% of which was set aside for Objective 1 regions, 11.5% for Objective 2, 12.3% for Objective 3, 0.5% for fisheries not covered by Objective 1, 5.35% for Community Initiatives, and 0.65% for innovative actions and technical assistance measures. The Commission drew up an indicative breakdown of funds per Member State, using objective criteria and taking into account the specificity of employment issues.

Decision-making point, where SD Guidance might be applied (1):

The Council of Ministers consider the allocation of funding to the SFs.

- How far are SD objectives taken into account and integrated into the decision? (eg by reference to the benefits from different parts of the EU Budget)
- How far is the issue of trade-offs understood, and integrated into the decision?
  (eg by reference to the impacts on different 'capitals')

The European Commission then invited Member States to submit their plans for Structural Funding for the period 2000-2006.

2. SUBMISSIONS BY THE MEMBER STATES TO THE EC

Depending on the case, the plans for SF intervention are drafted by the national and/or regional authorities, in partnership with economic and social actors, and grouped into National Development Plans. The Plans are normally drawn up in co-operation with the European Commission. National authorities or regions choose between two different types of programming system: Community Support Frameworks (CSF) and Operational Programmes (OP), or Single Programming Documents (SPD). These documents do not contain specific details of the measures to be funded (as they had done in the previous programming period). Therefore, after the programming documents have been adopted, the Member States or regions responsible also adopt a 'Programme Complement' for each programme, which indicates the details of the various measures proposed, in terms of beneficiaries and financial allocations.

a.   Community Support Frameworks and Operational Programmes:

For Objective 1, the CSF system is normally applied. Presentation of the CSF (the overall development plan) is complemented by a series of OPs (more specific programme proposals). These can relate to a particular region, or a particular development sector (transport, culture, business support, etc ….). For example, for the period 2000-2006, CSFs (and related OPs) have been prepared for the following regions:

- Germany (covering the New Lander and East Berlin)
- Greece (covering the whole country)
- Ireland (covering the whole country)
- Italy (covering the Mezzogiorno)
- Portugal (covering the whole country)
- Spain (covering Objective 1 regions)
- UK (covering Northern Ireland)

b.   Single Programming Documents:

For Objective 1 programmes where the allocation is lower than, or does not substantially exceed, 1 billion euros, and also in the case of Objective 2 (and Objective 3 and FIFG outside Objective 1 regions), the Member State will normally submit a Single Programming Document. This will contain similar information to that provided in the CSFs and OPs.

c.   Programme Complement:

This document sets out detailed information on the content of the programme at the measure level, in order to implement the programme strategy and priorities. It is drawn up by the Member States or the region, depending on the case, after consultation with the partners concerned, and sent to the Commission for information. It can be submitted at the same time as the draft SPD or OP, or afterwards. However, once the OP or SPD has been approved, the managing authority has just three months to adopt the Programme Complement.

For every programme, an ex-ante evaluation must be carried out, including an environmental assessment. The responsibility for this evaluation varies according to member state, lying either with the national or regional authorities.

Decision-making point, where SD Guidance might be applied (2):

The Member State defines the strategy and priorities for funding, to attain the objectives of development (Objective 1) or conversion (Objective 2).

- How far are SD objectives taken into account and integrated into the overall strategy when drafting the CSF/OPs and SPDs (and Programme Complements)?
- How far is the issue of trade-offs understood, and integrated into the design of the programme?

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Summary of responsibilities for the Member State

Although the division of responsibilities between a Member State and its regions varies between countries, in general the Member State has the responsibility for:

- Developing the National Development Plan (in consultation with regional, social and economic actors)
- Negotiating with the Commission, to transform the Plan into CSF/OPs or SPD
- Drafting the Programme Complement (although sometimes this is done at the regional level)
- The ex-ante evaluation
- Establishing institutional structures (the Managing Authority) and in consultation with the MA, the Programme Monitoring Committee

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3.   IMPLEMENTATION OF THE PROGRAMME

a.   Managing Authority ('Programme Secretariat'):

The Member State is required to designate a single "managing authority" responsible for supervising the implementation, ongoing management and effectiveness of the programme. Its duties include:

- Adopting the programme complement, and modifying it if necessary (i.e. it is not involved in drawing up the CSF/OPs and SPDs – is this right ?);
- Handling the selection of projects (for example, through calls for proposals);
- Gathering the financial and statistical information needed to monitor the programme;
- Installing and using a computerised management, monitoring and evaluation system;
- Ensuring sound financial management;
- Ensuring compliance with Community policies;
- Ensuring compliance with information and publicity obligations;
- Drawing up and submitting annual and final programme reports to the Commission;
- Organising the mid-term evaluation.

> It is therefore the managing authority that carries out the appraisal of proposed projects, against agreed project selection criteria by measure. Draft selection criteria can be provided in the Programme Complement. It also undertakes an additional appraisal of the proposals against the crosscutting themes of equal opportunities and social inclusion; sustainable development; and ICT.

The mid-term evaluation is also the responsibility of the managing authority, in co-operation with the Commission. It examines the initial results of the operations, their consistency with the ex-ante evaluation, the relevance of the targets, as well as the soundness of the financial management and the quality of monitoring and implementation of the programme concerned. It

is carried out by an independent assessor, submitted to the Monitoring Committee, and sent to the Commission no later than 31 December 2003.

In addition to the mid-term evaluation, there is the opportunity, at least once a year, for the European Commission and the managing authority to review the main outcomes of the previous year's implementation. Following this review, the Commission can transmit comments or suggestions for improving implementation to the managing authority.

Decision-making point, where SD Guidance might be applied (3):

The managing authority could be provided with SD Guidance on a number of issues:

- Project selection criteria: how far do the criteria integrate SD priorities?
- The mid-term evaluation: what emphasis is given to SD objectives? What consideration is there of trade-offs?
- The managing authority could also be advised by the Commission to take more account of sustainable development issues, either following submission of the annual reports, or following the mid-term evaluation.

Summary of responsibilities for the Managing Authority

Although the responsibilities of the Managing Authority vary from Member State to Member State, in general the Managing Authority is responsible for:

- Adopts the Programme Complement
- Identification of project proposals
- Specification of selection criteria, together with the Monitoring Committee
- Appraising project proposals
- Selecting projects
- Commissioning the mid-term evaluation (by independent assessors)
- Drawing up and submitting annual and final programme reports

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b.   Monitoring Committee:

The managing authority and Member State also set up a "Monitoring Committee" for each programme. The Monitoring Committee consists of representatives of the regions, the Member State, the responsible bodies and the European Commission, and is chaired by a representative of the managing authority, or of the Member State. Its aim it to monitor the progress of the programme's implementation, to ensure the quality and effectiveness of the programme's implementation and set guidelines where necessary. The Committee generally meets once or twice a year.

The Monitoring Committee has a number of specific responsibilities:

- It considers and approves the criteria for selecting the operations financed under each measure;
- It confirms the programme complement and any adjustment made to it by the managing authority; it may also request an adjustment;
- It periodically assesses the progress made towards achieving the specific objectives of the programme;
- It examines the results of implementation, and particularly the results of the mid-term evaluation before it is forwarded to the Commission;
- It approves the annual and final implementation reports before they are forwarded to the Commission;
- Generally, it may suggest to the managing authority any adjustment it deems necessary to improve the management of the programme.

Decision-making point, where SD Guidance might be applied (4):

The Monitoring Committee has the role of overseer of the programme, and as such, should be aware of SD issues:

- How much emphasis does the MC put on SD issues, when considering the progress of the programme?
- What consideration is there of trade-off issues?

Summary of responsibilities for the Programme Monitoring Committee

Although the responsibilities of the Monitoring Committee vary from Member State to Member State, in general it is responsible for:

- Approving the Programme Complement
- Approving the project selection criteria
- Monitoring the progress of the programme
- Approves the annual and final programme reports

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c.   Partnership:

Programmes are implemented through a partnership, which includes local and regional governments, the Commission, economic and social partners and other relevant bodies. The Member States are responsible for designating the most representative partners and ensuring that the appropriate partners are involved in each programming stage (preparation, financing, monitoring and evaluation of interventions).

Decision-making point, where SD Guidance might be applied (5):

- Member States can chose partners that have a particular interest in sustainable development, which can influence the direction and emphasis of interventions.

Summary of responsibilities for the Partnership

Although the responsibilities of the Partnership vary from Member State to Member State, in general it is responsible for:

- Preparation of project proposals
- Project implementation

TABLE A2.1: KEY DECISION POINTS AT WHICH SD GUIDANCE MIGHT BE APPLIED

Level	Stage	Actors	Qualitative questions on SD	Indicators
1. EU	**EC Treaty - Article 158ff**	MS (IGC and national ratification)	Incorporation and promotion of SD into objectives of Economic and Social Cohesion Policy	
2. EU	**Agenda 2000 Financial Framework 2000-2006 – Berlin European Council March 1999** Decisions on financial allocations and policy priorities in relation to CAP, Structural Funds, Cohesion Fund, and enlargement	DGs Regio, Agri, Employment etc General Affairs Council European Council		
3. EU	**Structural Funds Legislation** (General Regulation (1260/1999) and Fund-specific Regulations - June 1999	Community institutions	Definition of additional categories of eligible areas? (eg environmentally-sensitive areas; coasts threatened by sea-level rise) Additional, non-geographical, priorities eg energy sector?	
4. EU	**Cohesion Fund Regulation 1264/1999** **F**ocus on transport and environmental infrastructure in four poorest MSs	Community institutions	Why have a Cohesion Fund separate from Structural Funds? Why no environmental safeguards/partnership arrangements similar to those applying to Structural Funds? Why focus just on transport and environment infrastructure? Why not eg energy?	
5. EU	**Guidelines (COM (1999) 344: Guidelines for Programmes 2000-2006)** Environment and SD one of three 'cross-cutting themes' to be integrated across all priorities and measures	Commission - DG Regions	Status of Guidelines? Why no *detailed* guidance on how to mainstream SD throughout priorities and measures?	

Level	Stage	Actors	Qualitative questions on SD	Indicators
6. MS	**Develop National Development Plan**	Relevant national ministry(ies) Regions, stakeholders.	*Relevant to this and stages 7a,8a,8b,9a* Which ministries involved? Explicit links with national SD strategies?	
7. MS	**WHERE APPROPRIATE: Cohesion Fund - Strategic Reference Framework** (identifying CF priorities and explaining co-ordination/split with Structural Funds)	Relevant national ministry(ies)	Overall SD targets for programme? Extent of partnership? Role of environmental authorities? Was an *ex ante* environmental assessment done? Quality of SEA? Alternatives considered? At what stage? By whom? Impact on the strategy?	
7b	**WHERE APPROPRIATE: Cohesion Fund- project selection**	Relevant national ministry(ies)	Balance between transport and environment projects? Within transport, balance between road and rail?	
8. MS	**WHERE APPROPRIATE: Objective 1 - Develop Community Support Framework**	National ministry(ies) and Commission		
8b	**Objective 1 - Draft Operational Programmes**	National ministr(ies) = regional authorities	How far does selection of OPs reflect objectives in national development plan/CSF? Environmental profile?	
9. MS/ Regi on	WHERE APPROPRIATE: Draft Single Programming Document	MS Regional partners		What are the programme indicators and targets ? What are qualitative indicators that have not been turned into quantitative ones (and note which could be) ?
EU/MS	Draft SPD agreed with Commission	Commission Member State	Any Commission comments on mainstreaming SD themes?	
10. MS/ Reg	Programme Complement Includes : detailed measures, indicators, budget allocations, administrative arrangements	Drafted by the Programme secretariat and endorsed by monitoring committee (The PC could be decided by national rather than regional	Balance between budgetary allocations? Membership of Monitoring Committee? Role and resources of environmental authorities Any SD advisory groups? Extent of decentralisation to local areas?	

Level	Stage	Actors	Qualitative questions on SD	Indicators
		authorities in some MS)		
11. MS/ Reg	**Project selection/scoring criteria** **(**May be included in Programme Complement, or determined subsequently)	Drafted by the Programme secretariat and endorsed by monitoring committee	Is ENV/SD represented in the core selection criteria ? Quantitative or qualitative? How are env/SD criteria weighted in comparison with economic criteria? Are there minimum thresholds? How are these determined?	
12. Reg	**Identification of project proposals**	Programme secretariat Sub-regional partnerships	How do institutional /administrative structures condition which projects are being conceived? Have there been « outreach » activities to encourage appropriate project applications, and how does this take SD themes on board ? Has there been any training on SD for those involved in the project identification ?	
13. Reg	Preparation of project proposals	Who can make applications?	How does the preparation take sustainable development on board ? Has there been any training on SD for those involved in the project preparation? Are there any written guidelines on Env/SD for project preparation ?	
14. Reg	**Project Appraisal and selection**	Local partnerships Programme Secretariat PMC Steering Committee	How far does need for rapid spending lead to selection of existing projects in pipeline? Are some projects selected before formal selection criteria agreed? Are project selection and scoring criteria used *in practice?* Involvement of environmental authorities and/or SD Advisory Committee? Are there any appraisals of projects affecting proposed SACs (Article 6.3, Habitats Directive)? Outcome? To what extent do selected projects for 2000-2006 differ	Implementation indicators : Number of projects, amount of money (grant and total). What share goes to which SD element (e.g. which of the four capitals – prime, important, less important, irrelevant)

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Level	Stage	Actors	Qualitative questions on SD	Indicators
			from those for 1994-1999?	
15. Reg	Project monitoring and review	Project managers/ programme secretariat	Any project level SD targets? Any SD-related indicators?	
16. Reg	Programme Monitoring and Reporting Annual Implementation Reports to Commission	Programme Monitoring Committees	Are the annual reports required to report on SD, and if so, to what extent do they ? Any Commission response to 2001 annual report in relation to SD?	What indicators are used for monitoring and how do they relate to SD ? Are Env/SD represented in measure level indicators ?
17. MS/ Reg	Evaluation e.g. ex-ante mid term review ex-post	Programme secretariat	Is there already existing national guidance on content of mid-term evaluation? To what extent are all issues in this table covered?	What indicators are used for evaluation and how do they relate to SD ?
18.	Programme – revision		Scope for incorporating greatrer emphasis on SD issues post-2004?	

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ANNEX 3: CATEGORISATION OF SF INTERVENTIONS BY THE TYPE OF CAPITAL TO WHICH THE INTERVENTIONS ARE PRINCIPALLY DIRECTED

Manufactured Capital	Human Capital	Social Capital	Natural Capital
111 Investments in agricultural holdings 114 Improving processing and marketing of agricultural products 121 Investments in forest 122 Improving harvesting, processing and marketing of forestry products 123 Promoting new outlets for the use and marketing of forestry products 126 Afforestation of non-agricultural land 1304 Marketing of quality agricultural products 1307 Diversification of agricultural activities and activities close to agriculture, to provide multiple activities or alternative incomes 1309 Development and improvement of infrastructure connected with the development of agriculture 1310 Encouragement for tourist activities in rural areas 1311 Encouragement for craft activities in rural areas 1314 Financial engineering in rural areas 141 Adjustment of the fishing effort 142 Renewal and modernisation of the fishing fleet 143 Processing, marketing and promoting of fisheries products 144 Aquaculture 145 Equipment of the fishing ports and protection of the coastal marine zones 146 Socio-economic measures (including aids to the temporary stopping and compensation for technical restrictions) 151 Investment in physical capital (plant and equipment, cofinancing of state aids) – large firms 155 Financial engineering for large bus orgs 161 Investment in physical capital (plant and equipment, cofinancing of	112 Setting up of young farmers 113 Vocational training for farmers 128 Training for forestry 1303 Setting up of farm relief and farm management services 147 Actions by professionals (including vocational training, small coastal fishing) 154 Services to stakeholders (health and safety, providing care for dependants) – large 167 Vocational training - SMEs 174 Vocational training – Tourism 181 Research projects based in universities and research institutes **21 Labour market policy** **23 Developing educational and vocational training (persons, firms)** **24 Workforce flexibility, entrepreneurial activity, innovation, information and communication technologies**	124 Establishment of associations of forest holders 1305 Basic services for the rural economy and population 1306 Renovation and development of villages and protection and conservation of the rural heritage 153 Business advisory services (including internationalisation, exporting and environmental management, purchase of technology) – large 163 Business advisory services (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology) – SMES 164 Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs) - SMEs 166 Services in support of the social economy (providing care for	125 Restoring forestry production potential damaged by natural disasters and fire and introducing appropriate prevention instruments 127 Improving / maintaining the ecological stability of protective forests 1301Land improvement in rural areas 1302 Reparcelling 1308 Agricultural water resources management 1312 Preservation of the environment in connection with land, forestry and landscape conservation as well as with the improvement of animal welfare 1313 Restoring agricultural production potential damaged by natural disasters and

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state aids) – SMEs 165 Financial engineering – SMEs 171 Physical investment (information centres, tourist accommodation, catering, facilities) – tourism 172 Non-physical investments (development and provision of tourist services, sporting, cultural and leisure activities, heritage) 183 RTDI Infrastructure **31 Transport infrastructure (all modes)** 321 Basic infrastructure – ITC 322 Information and Communication Technology (including security and safe transmission measures) **33 Energy infrastructures (production, delivery)** **35 Planning and rehabilitation** 351 Upgrading and rehabilitation of industrial and military sites 352 Rehabilitation of urban areas	**(persons, firms)** **25 Positive labour market actions for women** 323 Services and applications for the citizen (health, administration, education) - ITC 324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking) **41 Technical assistance and innovative actions (ERDF, ESF, EAGGF, FIFG)**	dependants, health and safety, cultural activities) – SMEs 173 Shared services for the tourism industry (including promotional activities, networking, conferences and trade fairs) 182 Innovation and technology transfers, establishment of networks and partnerships between businesses and/or research institutes **22 Social inclusion** **36 Social infrastructure and public health**	introducing appropriate prevention instruments 152 Environment-friendly technologies, clean and economical energy technologies – large firms 162 Environment-friendly technologies, clean and economical energy technologies - SMEs **34 Environmental infrastructure (including water)**

Note: Some interventions relate to more than 1 capital (eg environmental infrastructure, shared business services). The categorisation is based on a view as to the principle purpose of the intervention. Thus environmental infrastructure represents an increase in manufactured capital, but is undertaken to increase natural capital. Shared business services contribute to human capital by increasing competencies, but is undertaken to increase the capacity of an area to support business development and expansion. There is an element of judgement required. The precise allocation of interventions may vary according to the rationales for individual measures in particular programmes. The purpose of the table is to illustrate how the SFs contribute directly to increasing all four capitals.

STRUCTURAL FUNDS: FIELDS OF INTERVENTION BY CATEGORY AND SUB-CATEGORY AND RELATED INDICATORS (Source: EC 1999, pp.45ff.)

Note: the Code column refers to the categories of capital in Table 4.2. The first letter is the type of capital which may be expected to be directly impacted by the intervention (E – environmental, H – human, S – social, M – manufactured; E-H means that both environmental and human capital may be impacted, etc.). The S and F after the / refer to whether the intervention may be expected to increase the Stock or the Flow from the relevant capital.

	CODE Table 5.2	OUTPUT INDICATOR	RESULT INDICATOR	IMPACT INDICATOR
1. PRODUCTIVE ENVIRONMENT				
11 Agriculture				
111 Investments in agricultural holdings	M/S			
112 Setting up of young farmers	H/S			
113 Vocational training	H/S			
114 Improving processing and marketing of agricultural products	M/F			
12 Forestry				
121 Investments in forest	E/S			
122 Improving harvesting, processing and marketing of forestry products	M/F			
123 Promoting new outlets for the use and marketing of forestry products	M/F			
124 Establishment of associations of forest holders	S/S			
125 Restoring forestry production potential damaged by natural disasters and fire and introducing appropriate prevention instruments	E/S			
126 Afforestation of non-agricultural land	E/S			
127 Improving/maintaining the ecological stability of protective forests	E/S			
128 Training	H/S			

13 Promoting the adaptation and the development of rural areas				
1301 Land improvement	E/S			
1302 Reparcelling	S/S			
1303 Setting up of farm relief and farm management services	M/F			
1304 Marketing of quality agricultural products	M/F			
1305 Basic services for the rural economy and population	S/F			
1306 Renovation and development of villages and protection and conservation of the rural heritage	*M/S*	- M^2 of village squares/ roads renewed - Number of buildings renewed - Number of projects receiving financial support	- Number of inhabitants living in the vicinity (less than 1 km) of renewed areas - Number of enterprises / shops installed in assisted areas	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - % inhabitants wishing to stay in the area in the next 5 years
1307 Diversification of agricultural activities and activities close to agriculture, to provide multiple activities or alternative incomes	M-S/F			
1308 Agricultural water resources management	E/F			
1309 Development and improvement of infrastructure connected with the development of agriculture	M/S	- Number of projects granted assistance		
1310 Encouragement for tourist activities	M-S/F			
1311 Encouragement for craft activities	M-S/F			
1312 Preservation of the environment in connection with land, forestry and landscape	E/S			

conservation as well as with the improvement of animal welfare				
1313 Restoring agricultural production potential damaged by natural disasters and introducing appropriate prevention instruments	M-E/S			
1314 Financial engineering	S/S			
14 Fisheries				
141 Adjustment of the fishing effort	M-H/F			
142 Renewal and modernisation of the fishing fleet	M/S	- Number of vessel owners briefed - Number/ tonnage of fishing vessels laid up (scrapped/ modernised/ replaced)	- Catch of laid-up vessels during their latest year of activity (tons **/** year / species)	- Reduction in catches of depleted stocks fished (tons by species) - % stocks fished above MBAL
143 Processing, marketing and promoting of fisheries products	M/F	- Tons/year of processed products	- Increase of processing capacity (%)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Value added per employee generated after 2 years
144 Aquaculture	M-H/S	- Number of farms receiving financial support - Additional capacity of supported farms (tons / year)	- Number of fishermen reconverted in aquaculture	- % increase of production of assisted farms (tons/year) after one year - Value added in assisted farms after one year (%) - Value added per employee of farms after one year (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
145 Equipment of the fishing ports and protection of the coastal marine zones	M/S	- Port capacity constructed or rehabilitated (number of boats, tonnage)	- Average turnaround time of vessels	- Tonnage of vessels using the port after one year - Catch landed (tons/ year/species)

		- Number of portside units built or surface area (Ha)		- Surface area (m2) of port side units bought or rented - Reduction in number of incidents (%) - Value added generated in the port area (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
146 Socio-economic measures (including aids to the temporary stopping and compensation for technical restrictions)	S/F			
147 Actions by professionals (including vocational training, small coastal fishing)	H/S	- Number of recognised qualifications available - Volume of training received (hours x trainees) - Number of ex-fishermen retrained	- % trainees successfully completing the course (Men/Women)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
15 Assisting large business organisations				
151 Investment in physical capital (plant and equipment, cofinancing of state aids)	M/S	- Number of large businesses receiving financial support	- Direct private investment in financially supported firms (in Meuro and % of total investment) - Floor space constructed / refurbished (m^2)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Increase in turnover of firms that have received financial support after two years (%)
152 Environment-friendly technologies, clean and economical energy technologies	M-H/S	- Number of environmental audits supported - Number of businesses receiving environmental advice from experts - Number of firms receiving financial support to introduce environmental technologies and to develop eco-products	- Number of recipient firms newly established in the environment sector - % firms qualifying for certification in respect to environmental norms	- Increase in turnover of assisted firms in the environment sector after two years (%) - Number of new products / processes introduced - Environmental impact of firms' activities in terms of decreased pollution (CO2, NOx, etc. in %)

153 Business advisory services (including internationalisation, exporting and environmental management, purchase of technology)	H/S	- Number of assisted businesses - Number of advisory services provided	- Number of businesses becoming new exporters - Number of businesses exporting to new markets - % businesses satisfied with services provided	- % export sales in turnover of assisted businesses after 18 months - Increase in value added generated after 18 months - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
154 Services to stakeholders (health and safety, providing care for dependants)	S/F	- Number of businesses receiving financial support - Number of nurseries receiving financial support	- % of employees having access to services provided	- Satisfaction rate of clients (male/female) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
155 Financial engineering	S/S	- Number/volume of guarantee funds receiving financial support - Number of leasing operation schemes receiving financial support	- Number of companies satisfied with funding provided	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
16 Assisting SMEs and the craft sector				
161 Investment in physical capital (plant and equipment, cofinancing of state aids)	M/S	- Number of SMEs receiving financial support (Men/Women owners) - Number of new SMEs receiving financial support (Men/Women owners)	-New/increased sales in SMEs (MEuro) - Direct private investment in financially supported firms (in Meuro and % of total investment) - Number of women project owners in private projects (% of total)	- Survival rate of new SMEs receiving financial support still in business after 18 months (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Increase in turnover of firms having received financial support after two years
162 Environment-friendly technologies, clean and economical energy technologies	M-H/S	- Number of firms receiving financial support to introduce environmental technologies or to develop eco-products - Number of environmental audits supported	- Number of recipient firms newly established in the environment sector - % firms qualifying for certification in respect to environmental norms - Reduction in SME energy cost (%) - Direct private investment in financially	- Turnover of assisted firms in the environment sector after two years - Number of new products / processes introduced - Increase in sales of environmentally friendly products (%)

		- Number of SMEs involved in cross-border projects - Number of SMEs receiving environmental advice from experts	supported firms (in Meuro and % of total investment)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Environmental impact of firms' activities in terms of decreased pollution (CO2, NOx, etc. in %)
163 Business advisory services (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology)	H/S	- Number of SMEs (Men/Women owners) receiving advisory services	- Number of SMEs becoming new exporters - Number of SMEs exporting to new markets - % SMEs satisfied with services provided	- % export sales in turnover of assisted SMEs after 18 months - Increase in value added generated after 18 months - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
164 Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs)	S/F	- Ha of industrial sites made available. - Number of projects receiving financial assistance - Direct private investment in financially supported firms (in Meuro and % of total investment)	- Satisfaction rate of beneficiaries (male/female) - Increase in value added after 18 months (%)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Regional firms of which SMEs as a % of suppliers to assisted businesses after 18 months ("knock-on effects")
165 Financial engineering	S/S	- Number/volume of venture and seed capital funds receiving financial support - Number/volume of guarantee funds receiving financial support - Number of leasing operation schemes receiving financial support	- Number of new businesses launched/developed (Men/Women) - Number of SMEs satisfied with funding provided (Men/Women)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
166 Services in support of the social economy (providing care for dependants, health and safety, cultural activities)	S/F	- Number of organizations and schemes receiving financial support - Number of community	- % assisted organizations located in poor urban sub-areas or whose members live principally in poor urban sub-areas - Average interest rate offered in % of	- Number of adults (men/women) active in assisted community organizations after one year - % of adults (men/women) active in

		organizations that have had their project accepted	standard commercial rates	assisted community organizations - Number of local inhabitants (men/women) using supported debt counselling and local credit schemes per year after one year - % users having succeeded in eliminating debts after one/three years
167 Vocational training	H/S			
17 Tourism				
171 Physical investment (information centres, tourist accommodation, catering, facilities)	M/S	- Number of beds created or improved - Number of hotels developed/ upgraded - Number of attractions created / improved - New tourism businesses established (Men/Women owners)	- % of beds created or improved - Number of nights sold per year in assisted accommodation (after one year) - Satisfaction rate of clients (men/women in %)	- Value added generated per year (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
172 Non-physical investments (development and provision of tourist services, sporting, cultural and leisure activities, heritage)	M-H/F	- Number of economic units receiving financial support - Number of festivals and events receiving financial support	- Average cost of a stay (euro per person) - Average number of visitors per day	- Number of visits per year to assisted facilities - Value added generated (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
173 Shared services for the tourism industry (including promotional activities, networking, conferences and trade fairs)	M-H/ S-F	- Floor space made available (m^2) - Number of new marketing initiatives / schemes promoted - Number of conferences/ exhibitions organised	- % conferences / exhibitions linked with local economic activities - Satisfaction rate of beneficiaries (men/women in %)	- Number of commercial contacts for local firms due to the activity of the centre after one year - Number of firms having used the centre for promotion after one year
174 Vocational training	H/S	- Number of recognised qualifications available	- Volume of training received (hours x trainees) - % trainees successfully completing the	

			course (Men/Women)	
18 Research, technological development and innovation (RTDI)				
181 Research projects based in universities and research institutes	H/S	- Number of research projects supported - Number of supported research students (Men/Women)	- % projects successfully completed publications, etc.) - Number of supported researchers obtaining a PhD (Men/Women) - Increase of RTD personnel employed (number and % of total jobs, Men/Women)	- Number of patents taken out from innovations being developed - Number of new firms started by academics
182 Innovation and technology transfers, establishment of networks and partnerships between businesses and/or research institutes	H-S/S	- Number of firms receiving financial support for RTDI projects and technology purchase - Number of advice/ training sessions - Number of SMEs assisted - Number of collaborative projects between firms and research institutions supported	- Number of local enterprises involved in supported joint research projects (of which SMEs) - Increase of investment in RDTI by enterprises involved in joint projects. - % SMEs satisfied with the service	- Number of collaborative arrangements between research institutions and assisted firms after one year - Number of regional enterprises involved declaring positive spin-offs after 18 months (of which SMEs) - Number of assisted firms purchasing patents, licenses or involved in collaborative projects (after one year) - Number of new products/processes marketed by firms receiving financial support - Value added generated after two years - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
183 RTDI infrastructure	M/S	- Surface area made available (Ha) - Floor space constructed / refurbished (m^2) - Number of joint services created	- Number of R&D jobs created (FTEs Men/Women) - Number of SMEs having access to joint services	- Number of small firms established in park (after one year) - Number of small high-tech firms established in park (after one year) - Gross/net employment created or safeguarded after 2 years (number and

			% of total jobs)
2. HUMAN RESOURCES			
21 Labour market policy **Assistance to persons** (Training, counselling and guidance, Employment aid, Integrated measures…) **Assistance to structures and systems:** (Teacher training – Advisory and guidance services,…)	H/S	- Number of beneficiaries - Number of places offered - Number of trained trainers - Number of projects	- Placement rate of beneficiaries into employment (%) - Unemployed making use of supplementary advisory services (%) - Increase in the coverage ratio of the reference population (%)	- Placement rate of thebeneficiaries after 1 year - Unemployment reduction of target population (%) - Placement rate of the beneficiaries after 1 year
22 Social inclusion **Assistance to persons** **(**Pathways to integration, integrated measures, specific training measures,..) **Assistance to structures and systems** (social accompaniment, information, local initiatives for development of employment,…)	H-S/S	- Number of beneficiaries - Number of local initiative projects - Number of projects	- Increase in duration of work experience (average/beneficiary) - Raising of qualifications (number of beneficiaries having obtained a diploma or certificate) - Satisfaction rate of beneficiaries (%) - Number of associations of socio-economic partners within the framework of territorial pacts created - Increase in the coverage ratio of the reference population (%)	- Placement rate of the beneficiaries after 1 year - Unemployment reduction of target population (%) - Sustainability of associations (% still existing 2 years after end of support)
23 Developing educational and vocational training (persons, firms) **Assistance to structures and systems** (Progression Pathways for early school leavers, low educated adults,	*H/S*	- Number of training places created (hours, days) - Number of projects - Number of trainers / counsellors having raised their qualifications	- Increase in the coverage ratio of the reference population (%)	- Diminution of early school leavers (%) - Increase in target population qualifications (%)

training of trainers …)				
24 Workforce flexibility, entrepreneurial activity, innovation, information and communication technologies (persons, firms) **Assistance to persons, companies** **Assistance to structures and systems** (social accompaniment, information, local development initiatives, social economy…)	H-S/S	- Number of employees in training programmes (type, duration) - Number of SMEs reached receiving financial support for training (size, type, duration) - Number of beneficiaries - Number of counselling services offered to SMEs - Number of projects	- Increase in SMEs training budget (% increase)	- Number of beneficiaries (persons) having launched a business after 2 years (Men/Women) - Increase in value added after 18 months - Rise in worker productivity as a result of raised skill levels (% increase in turnover / employee) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
25 Positive labour market actions for women **Assistance to persons (**career progression of women, entrepreneurship among women,..) **Assistance to structures and systems (**awareness events, networking,**..)**	*H-S/S*	- Number of beneficiaries - Amount of business grants/loans (average/beneficiary) - Number of hours spent in "specific action" –training - Number of awareness raising events - Number of new networks supported - Number of projects	- Placement rate of beneficiaries into employment (%) - Proportion of target population having participated in "specific actions"	- Increase in female activity rates in the labour market (%) - Increase in female employment rates in the labour market after 1 year - Increase of women/ men employed in male/female dominated sectors and occupations after 2 years (%) - Sustainability of networks (% still existing 2 years after end of support)
3. BASIC INFRASTRUCTURE				
31 Transport infrastructure				
311 Rail	M/S	- Km of high speed railway constructed or upgraded (%	- Time saved (journey time x number of users)	- Increase in flow of passengers/freight after one year (%)

		degree of network completion) - Railway track improved (km)	- Time saved (journey time x freight/ passengers volume) - Accessibility (reduction of ESS, equiv. straight line speed)	- Environmental impact (% increase/ decrease) - Change in traffic noise (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Satisfaction rate of users (%)
312 Roads	M/S			
313 Motorways	M/S	- Km of motorway constructed or upgraded (% degree of network completion)	- Time saved (journey time x number of users) - Time saved (journey time x freight/ passengers volume) - Accessibility gains (reduction of ESS)	- Increase in traffic flow of vehicles/freight after one year (%) - Environmental impact (% increase) - Change in traffic noise (%) - Ha of natural site altered - Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Increase in safety (number of traffic accidents after one year)
314 Airports	M/S	- Number of airports constructed or upgraded	- Increase of number of destinations served by regular service by air - Average increase in number of passengers per year	- Environmental impact (% increase or decrease) - Change in traffic noise (%) - Increase in traffic flow of passengers/freight after one year (%) - Gross/net employment created or safeguarded 2 years (number and % of total jobs)
315 Ports	M/S	- Number of ports and harbours upgraded	- Increase in number of containers per year - Reduction of waiting time of ships before docking (%) - Reduction of turnaround time of vessels - Increase of number of shipping lines calling in the port - Reduction of average import dwell time	- Increase in traffic flow of passengers/vehicles/ freight after one year (%) - Environmental impact (% increase/ decrease) - Gross/net employment created or safeguarded after 2 years (number and

			- Reduction of turnaround time of road vehicles	% of total jobs)
316 Waterways	M/S			
317 Urban Transport		- Number of public transport services improved	- Number of users served (increase in % of population)	- Reduction in traffic flow of vehicles after one year (%) - Environmental impact (% decrease) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Satisfaction rate of users (%)
318 Multimodal Transport	M/S	- Number of multi-modal centres receiving financial support	- Increase of speed of goods transported through the centre (%) - Time saved (journey time x freight/ passengers volume)	- Increase in traffic flow of vehicles/freight after one year (%) - Freight traffic withdrawn from road (tons/year) - Environmental impact (% decrease) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
319 Intelligent Transport Systems	M/S			
32 Telecommunications infrastructure and information society				
321 Basic infrastructure	M/S			
322 Information and Communication Technology (including security and safe transmission measures)	M/S	- Number and % increase in digital telephone lines - Number of ISDN subscriptions per 1000 inhabitants - Length of broad-band network (optical fiber) installed (km) - Number of Internet hosts per 1000 inhabitants	- Reduction of number of network failures - Number of services created (Internet access) - Number of SMEs and large companies developing and commercialising Information Technology services - Total hours of connection / month (after 6 months)	- Gross/net employment created (number and % of total jobs)
323 Services and applications	H/S	- Number of retraining courses	- Number of users/trainees	- % participants placed into jobs within

for the citizen (health, administration, education)		- Number of online services created - Number of training hours (hours x trainees) - Number of trainees (Men/Women)	- Satisfaction rate of users/trainees (%)	6 months (Men/Women)
324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking)	H-S/S	- Number of start-up firms providing Information Technology related services (on-line, ecommerce, etc.)	- Number of SMEs receiving financial support, getting access to services created (Internet access) - Number of SMEs developing and commercialising Information Technology services - Number of internet PoP (Point of presence) per local call area	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
33 Energy infrastructures (production, delivery)				
331 Electricity, gas, petrol, solid fuel	M/S	- Number of new plants assisted KW/MW of new or upgraded capacity broken down by source of energy (% degree of network completion) - Km of electric power/ gas distribution network constructed / upgraded (% degree of network completion) - Km of new/upgrade lines/pipes	- Increase of estimated number of users (using average coefficients of energy consumption) (%) - Number of duration of interruptions of electric power distribution for the average user connected to the network to which the new plant is linked - Number of users connected or upgraded to the new network - Reduction in energy costs (Euro/KWh) - Number of duration of interruptions of electric power distribution for the average user connected to the network to which the new plant is linked	- Efficiency increases in supported plants and installations (TPE) - % change of environmental impact in terms of increased or decreased pollution (CO2, SO2, NOx…) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Value added generated by the plant (Euro/year)
332 Renewable sources of energy (solar power, wind power, hydro-electricity, biomass)	M/S	- Number of new plants assisted - KW/MW of new or upgraded capacity broken down by source of energy	- Increase of estimated number of users (using average coefficients of energy consumption) (%)	- Increase in share of renewable energy sources compared to total energy supply (%) - Gross/net employment created or

				safeguarded after 2 years (number and % of total jobs)
333 Energy efficiency, cogeneration, energy control	M/S			
34 Environmental infrastructure (including water)				
341 Air	M/S	- Number of electricity plants provided with air pollution filters	- Improvement of energy provision efficiency (%)	- Environmental impact in terms of decreased pollution (CO2, SO2, NOx… in %) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
342 Noise	M/S	- Km of motorway provided with noise reducing walls		- Reduction of traffic noise (%)
343 Urban and industrial waste (including hospital and dangerous waste)	M/S	- Capacity improvements of waste disposal or recycling facilities (% increase)	- Number of households served for collection of municipal solid waste (% population)	- Amount of solid waste collected for recycling (tons/year) after one year - % solid waste recycled for reuse - % unauthorised landfill sites closed/ rehabilitated - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
344 Drinking water (collection, storage, treatment and distribution)	M/S	- Number of firms receiving financial support to introduce environmental technologies and to develop ecoproducts (of which SMEs)	- Number of households served by new/ improved networks (% population) - Number of days with insufficient supplies (per 1000 households)	- Volume of water consumed through new/improved networks after one year - Improvement of water consumption efficiency (%) - Reduction of leakage from the supply network (%) - Increase in share of industrial discharges connected to waste water treatment plant (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)

345 Sewerage and purification	M/S	- Capacity improvements for water treatment and purification plants (m^3) - Number of water saving schemes	- % wastewater undergoing primary treatment - % wastewater undergoing secondary treatment - % households/ businesses served by new/improved water supply systems	- % wastewater samples from point sources showing a specified level of decline of identified pollutants - Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
35 Planning and rehabilitation				
351 Upgrading and rehabilitation of industrial and military sites	E-M/S	- Rehabilitation of derelict land (Ha) - Purchased, constructed or refurbished floor space in m^2	- Number of enterprises installed in assisted areas after one/three years - % of users that are satisfied with the project (Men/Women)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs)
352 Rehabilitation of urban areas	S-M/S	- Number of community organisations' projects supported - Number of urban renewal projects supported - Number of buildings renovated	- Number of businesses/ commerce settling in the renewed areas - Increase in number of residents located in the vicinity (less than 1 km) of the renovation area	- Value added generated in local businesses after one/three years (%) - Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - % residents located in assisted urban areas declaring to remain in the area in the next 5 years
36 Social infrastructure and public health	M/S	- Number of community health centres supported - Number of hospitals constructed or upgraded - Number of nurseries supported - Number of kindergartens supported - Number of centres for elderly people supported - Number of centres for disabled people supported	- Increase in number of users served by supported infrastructure/ services (%)	- Gross/net employment created or safeguarded after 2 years (number and % of total jobs) - Increase in labour market activity rate of women (%)
4. MISCELLANEOUS				

41 Technical assistance and innovative actions (ERDF, ESF, EAGGF, FIFG)	H/S-F			
411 Preparation, implementation, monitoring, publicity	H/S-F			
412 Evaluation	H/S-F			
413 Studies	H/S-F			
414 Innovative actions	H/F			

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ANNEX 4: A BRIEF DESCRIPTION OF THE MAJOR INDICATOR SETS

IS1: EUROSTAT: Selection from UN Commission for Sustainable Development (CSD)'s Sustainable Development Indicator Set

In 1996 the UNCSD published its first set of sustainable development indicators (SDIs), comprising 134 economic, social and environmental indicators (UN 1996). The indicators were structured in a matrix that related Driving Force, State and Response indicators to the chapters in Agenda 21. Because it felt that not all the indicators were relevant for the European Union, EUROSTAT carried out a study using a subset of 36 of these indicators, publishing the results of the study in 1997 (EUROSTAT 1997). UNCSD subsequently produced a 'core' set of 59 SDIs based on its original set, and EUROSTAT (2001a) did another study involving 63 indicators, which related closely to the UNCSD core set. These are the indicators which are reproduced in Annex IS1.

IS2: EUROSTAT: Environmental Pressure Indicators for the EU (EUROSTAT 2001b)

This consists of 48 environmental indicators divided up into nine environmental themes. It is a development from EUROSTAT 1999, which published a set of 60 indicators in ten themes (six per theme), which was derived from a consultation of several thousand European experts, who both identified the themes as the most important environmental problems facing Europe, and the indicators as the best reflection of the pressures being put on the environment in relation to the themes. The theme dropped in EUROSTAT 2001 was Loss of Biodiversity, because of the weakness of the indicators. It is intended to restore this theme in due course. The indicators suggested for it are listed in Annex IS2.

IS3: OECD: OECD Environmental Data Compendium (OECD, 1999) and other OECD datasets

This is a Compendium of environmentally relevant data, structured according to a Pressure-State-Response framework, where Pressure includes both direct environmental pressures and the indirect pressure of the human activities producing the direct pressures, the States refer to various environmental conditions and the Responses relates to societal intentions and actions in respect of the environmental conditions, and include general data. The Compendium has been published every two years since 1993 and is used as the indicator framework for the OECD country environmental performance reviews. Ten Headline indicators have been selected from this Compendium (OECD 2001a), and the indicators have been also selected or combined to form the environmental indicators of the OECD sustainable development indicator set (OECD 1998, 2001b)

IS4: OECD: OECD sustainable development indicators (OECD 1998, 2001b)

IS5: EEA: Environment Signals 2001 (EEA, 2001)

This indicator set from the European Environment Agency (EEA) was first published in 2000. Its indicators are organised in the DPSIR framework, standing for Driving Forces (causes of

impacts), Pressures on the environment (mainly pollutants), States of the environment (reflecting its quality), resulting Impacts on health, ecosystems, materials, and Responses (policies, targets). It has one chapter on sectoral integration, five chapters on environmental pressures, one on headline environmental issues, and seven on different aspects of the environment.

A BIBLIOGRAPHY OF THE MAJOR INDICATOR SETS

IS1: UN (United Nations) 1996 *Indicators of Sustainable Development: Framework and Methodologies*, UN, New York

EUROSTAT 1997 *Indicators of Sustainable Development*, Office for Official Publications of the European Communities, Luxembourg

EUROSTAT 2001a *Measuring Progress Towards a More Sustainable Europe: Proposed Indicators for Sustainable Development*, Office for Official Publications of the European Communities, Luxembourg

IS2: EUROSTAT 1999 *Towards Environmental Pressure Indicators for the EU*, Office for Official Publications of the European Communities, Luxembourg

EUROSTAT 2001b *Environmental Pressure Indicators for the EU*, Office for Official Publications of the European Communities, Luxembourg

IS3: OECD (Organisation for Economic Co-operation and Development) 1999 *OECD Environmental Data: Compendium 1999*, OECD, Paris

OECD (Organisation for Economic Co-operation and Development) 2001a *Key Environment Indicators*, OECD, Paris, available on
http://www.oecd.org/pdf/M00019000/M00019613.pdf

IS4: OECD (Organisation for Economic Co-operation and Development) 1998 *Towards Sustainable Development: Environmental Indicators*, OECD, Paris, available on

OECD (Organisation for Economic Co-operation and Development) 2001b *OECD Environmental Indicators: Towards Sustainable Development 2001*, OECD, Paris

IS5: EEA (European Environment Agency) 2001 *Environmental Signals 2001*, EEA, Copenhagen, available on http://reports.eea.eu.int/signals-2001/en/signals2001

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IS1: EUROSTAT (2001a): UNCSD SUSTAINABLE DEVELOPMENT INDICATORS

SOCIAL DIMENSION

UN Theme: EQUITY

Poverty	Population living below poverty line
	Measures of income inequality
	Unemployment and youth unemployment rates
	Scoial benefits per capita
Gender equality	Femal to male wage ratio
Child welfare	Child welfare

UN Theme: HEALTH

Nutrition status	Nutritional status of population
Illness	Mortality due to selected key illnesses
Mortality	Infant mortality
	Life expectancy at birth
Sanitation	Population connected to sanitation system
Healthcare delivery	National health expenditure
	Immunisation against childhood diseases

UN Theme: EDUCATION

Education level	Levels of educational attainment
Literacy	Low qualification levels

UN Theme: HOUSING

Living conditions	Number of rooms per capita
	Household composition

UN Theme: SECURITY

Crime	Reported crimes

UN Theme: POPULATION

Population change	Population growth rate
	Population density
	Net migration rate

ENVIRONMENTAL DIMENSION

UN Theme: ATMOSPHERE

Climate change	Per capita emissions of greenhouse gases
Ozone layer depletion	Consumption of ozone depleting substances
Air quality	Air pollutants in urban areas

UN Theme: LAND

Agriculture	Agriculture area and organic farming
	Nitrogen balances
	Use of agricultural pesticides
Forests	Total forest area
	Wood harvesting ratio

Urbanisation	Growth of built-up area

UN Theme: OCEAN, SEA AND COASTS

Coastal zone	Eutrophication of coasts and marine waters
Fisheries	Fish catches by selected over-exploited species

UN Theme: FRESH WATER

Water quantity	Intensity of water use
Water quality	BOD concentration in selected rivers
	Quality of bathing waters

UN Theme: BIODIVERSITY

Ecosystem	Protected area as a percent of total area
Species	Number of threatened species

ECONOMIC DIMENSION

UN Theme: ECONOMIC STRUCTURE

Economic performance	Per capita GDP
	Investment share in GDP
	Value added by main sector
	Inflation rate
Trade	Net current account
	EU and international markets
Financial status	Public debt
	Aid to developing countries

UN Theme: CONSUMPTION AND PRODUCTION PATTERNS

Material consumption	Material consumption
Energy use	Per capita gross inland energy consumption
	Renewable energy sources
	Intensity of energy use
Waste generation and management	Generation and disposal of municipal waste
	Generation of industrial waste
	Generation and disposal of hazardous waste
	Generation and disposal of radioactive waste
	Recycling of waste: paper and glass
	Waste treatment and disposal facilities
Transportation	Passenger transport by mode
	Freight transport by mode
Environmental protection	Environmental protection expenditures

INSTITUTIONAL DIMENSION

UN Theme: INSTITUTIONAL CAPACITY

Information access	Internet access
Communication infrastructure	Communication infrastructure
Science and technology	Expenditure on research and development
Natural disaster preparedness and response	Risks to human and natural capital

IS2: EUROSTAT (2001b): ENVIRONMENTAL PRESSURE INDICATORS FOR THE EU

Theme: Resource Depletion

RD-1 Water consumption

RD-2: Energy use

RD-3: Increase in territory permanently occupied by urbanisation

RD-4: Inputs of phosphate to agricultural land

RD-5: Electricity production from fossil fuels

RD-6: Timber balance

Theme: Waste

WA-1: Waste landfilled

WA-2: Waste incinerated

WA-3: Hazardous waste generated

WA-4: Municipal waste generated

WA-5: Industrial waste generated

WA-6: Waste recycled/material recovered

Theme: Dispersion of Toxic Substances

TX-1: Consumption of pesticides by agriculture

TX-2: Emissions of persistent organic pollutants (POPs)

TX-3: Consumption of toxic chemicals

TX-4: Index of heavy metal emissions to water

TX-5: Index of heavy metal emissions to air

Theme: Water Pollution

WP-1: Nutrient emissions from households

WP-2: Nutrient emissions from industry

WP-3: Pesticides used per hectare of utilised agriculture area

WP-4: Nitrogen quantity used per hectare of utilised agriculture area

WP-5: Emissions of organic matter from households

WP-6: Emissions of organic matter from industry

Theme: Marine Environment and Coastal Zones

ME-1: Eutrophication

ME-2: Fishing pressure

ME-3: Development along shore

ME-3B: Wetland loss in the coastal zones

ME-4: Discharges of heavy metals

ME-5: Oil pollution at coast and at sea

ME-6 (new): Tourism intensity

Theme: Climate Change

CC-1: Emissions of carbon dioxide (CO_2)

CC-2: Emissions of methane (CH_4)

CC-3: Emissions of nitrous oxide (N_2O)

CC-4 (new): Emissions of HFCs, PFCs and SF_6

Theme: Air Pollution

AP-1: Emissions of nitrogen oxides (NO_x)

AP-2: Emissions of non-methane volatile organic compounds (NMVOCs)

AP-3: Emissions of sulphur dioxide (SO2)

AP-4: Emissions of particles

AP-5: Consumption of petrol and diesel oil by road vehicles

AP-6: Primary energy consumption

Theme: Ozone Depletion

OD-1: Emissions of bromofluorocarbons (halons)

OD-2: Emissions of chlorofluorocarbons (CFCs)

OD-3: Emissions of hydrochlorofluorocarbons (HCFCs)

OD-4: Emissions of chlorinated carbons

OD-5: Emissions of industrially produced methyl bromide (CH3Br)

Theme: Urban Environmental Problems

UP-1: Urban energy consumption

UP-2: Non-recycled municipal waste

UP-3: Non-treated urban waste water

Theme: Loss of Biodiversity (only in EUROSTAT 1999 and not EUROSTAT 2001)

LB-1: Protected area loss, damage and fragmentation

LB-2: Wetland loss through drainage

LB-3: Agriculture intensity: area used for intensive arable agriculture

LB-4: Fragmentation of forests and landscapes by roads/intersections

LB-5: Clearance of natural and semi-natural forested areas

LB-6: Change in traditional land-use practice

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IS3: OECD: TEN HEADLINE INDICATORS (OECD, 2001), OECD ENVIRONMENTAL DATA COMPENDIUM (OECD, 1999), OECD SUSTAINABLE DEVELOPMENT INDICATORS (OECD, 2001a)

OECD HEADLINE ENVIRONMENTAL INDICATORS

1. CLIMATE CHANGE – CO2 emission intensities
2. OZONE LAYER - ozone depleting substances
3. AIR QUALITY – SOx and NOx emission intensities
4. WASTE GENERATION – municipal waste generation intensities
5. FRESHWATER QUALITY – waste water treatment connection rates
6. FRESHWATER RESOURCES – intensity of use of water resources
7. FOREST RESOURCES – intensity of use of forest resources
8. FISH RESOURCES – intensity of use of fish resources
9. ENERGY RESOURCES – intensity of energy use
10. BIODIVERSITY – threatened species

OECD COMPENDIUM

Theme: Air
Total emissions of traditional air pollutants
Emissions of Sox by source
Emissions of NOx by source
Emissions of particulates by source
Emissions of CO by source
Emissions of VOC by source
Emissions of CO2 from energy use
Emissions of CO2 by source
Emissions of greenhouse gases
Concentrations of SO2
Concentrations of NO2
Concentrations of particulates
Concentrations of lead

Theme: Inland Waters
Estimates of renewable freshwater resources
Freshwater abstractions by source
Freshwater abstractions by major use
Water prices
Population connected to sewerage
Population connected to public waste water treatment plants
Sewage sludge production and disposal
Water quality of selected rivers:
        Dissolved oxygen; Biochemical oxygen demand; Nitrates; Phosphorus;
        Ammonium; Lead; Cadmium; Chromium; Copper
Water quality of selected lakes:
        Total phosphorus; Total nitrogen

Theme: Land
Land use

Changes in land use
Major protected areas

Theme: Forests
Wooded area
Forest cover
Volume of standing wood and production of roundwood, fuelwood and charcoal
Forest depletion and growth
Production of industrial roundwood and forest industry products
Trade in forest industry products, total and per capita
Trade in roundwood and forest industry products, by product
Trade in roundwood and forest industry products, by world region
Imports of cork and wood from tropical countries
Forest ownership
Burned area of forest and other wooded land

Theme: Wildlife
State of mammals, birds and fish
State of reptiles, amphibians and invertebrates
State of vascular plants, mosses, lichens, fungi and algae
Catches of fish and other aquatic animals and products
Fishery production
Fish consumption
Biosphere reserves and wetlands of international importance

Theme: Waste
Amounts of waste generated by sector
Amounts of waste generated by selected waste stream
Generation of municipal waste
Production movement and disposal of hazardous waste
Waste recycling rates: paper and cardboard
Waste recycling rates: glass
Waste treatment and disposal installations
Nuclear waste: spent fuel arisings

Theme: Risks
Accidental oil spills from tankers
Major floods and related losses
Major natural disasters of geological origin
Major climatic and meteorological disasters

Theme: Energy
Indigenous energy production and consumption
Net oil imports
Total primary energy supply
Energy supply by primary source
Total energy supply per unit of GDP and per capita
Electricity generated, total and by source
Final consumption of energy, total, by type, by sector, per unit of GDP and per capita

Theme: **Transport**

Road network length: all roads and motorways

Road vehicle stocks: motor vehicles, passenger cars, goods vehicles

Road traffic volumes: motor vehicles, passenger cars, goods vehicles

Transport by mode: passengers, freight

Total final energy consumption by the transport sector

Consumption of road fuels

Road fuel prices and taxes

Theme: **Industry**

Industrial production

Industrial structure

Selected environmentally significant industries (pulp & paper, chemical products, petroleum refineries, iron & steel, electrical machinery, motor vehicles)

Business sector investment

International tourist receipts

Theme: **Agriculture**

Arable and permanent cropland and grassland

Irrigated area

Economically active population in the primary sector

Tractors and combined harvesters-threshers in use

Total energy consumption by agriculture

Apparent consumption of nitrogenous fertilisers

Apparent consumption of phosphate fertilisers

Apparent consumption of commercial fertilisers (NPK)

Consumption of pesticides

Livestock

Agricultural production

Theme: **Environmental Expenditure and Taxes**

Pollution abatement and control expenditure

Public R&D expenditure for environmental protection

Official development assistance

Revenues from environmentally related taxes

Theme: **Multilateral Agreements**

Multilateral conventions on the environment (general, atmospheric pollution, inland water pollution, fisheries, flora and fauna, nuclear, marine pollution, miscellaneous)

Theme: **General Data**

National populations and population density

Trends in and structure of gross domestic product

Trends in final consumption expenditure

Structure of households' final consumption expenditure

IS4: OECD SUSTAINABLE DEVELOPMENT INDICATORS (OECD 1998, 2001b)

Environmental indicators

Issue	Indicator area	Indicators
Climate change	• CO2 emission intensities	• CO2 emissions per GDP, 1995
		• CO2 emissions per capita, 1995
		• CO2 emission by sector, 1995
		• Trend in CO2 emissions 1980-95
	• Greenhouse gas concentrations	• Trend in atmospheric concentration of CO2, CH4, N2O, total gaseous chlorine, CFC11 & CFC12 late 70s - mid 90s
Ozone layer depletion	• Ozone depleting substances	• Production of CFCs and halons
		• Production of HCFCs and methyl bromide
	• Stratospheric ozone	• Total ozone column over selected cities
Air quality	• Air emission intensities	• SO2 emissions per GDP, mid-90s
		• SO2 emissions per capita, mid-90s
		• Change in SO2 emission since 1980
		• Trend in SO2 emissions 1980-95
		• NOx emissions per GDP, mid-90s
		• NOx emissions per capita, mid-90s
		• Change in NOx emission since 1980
		• Trend in NOx emissions 1980-95
	• Urban air quality	• Trend in SO2 concentration in selected cities during the 90s
		• Trend in NO2 concentration in selected cities during the 90s
		• Annual average SO2 concentrations in selected cities during the 90s
		• Annual average NO2 concentrations in selected cities during the 90s
Waste	• Waste generation	• Municipal waste generation intensities per capita
		• Municipal waste proportion going to landfill
		• Industrial waste per GDP
		• Nuclear waste per capita
		• Hazardous waste per GDP
	• Waste recycling	• Paper recycling rates
		• Glass recycling rates
Water quality	• River quality	• Trend in dissolved oxygen in selected rivers, 1980-95
		• Trend in nitrate content in selected rivers, 1980-95
	• Waste water treatment	• Sewerage and sewage treatment connection rates, mid-1990s
		• Trend in sewage connection rates, 1980-95
		• Public expenditure on waste water treatment

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Resources Indicators

Issue	Indicator area	Indicators
Water resources	• Intensity of use of water resources • Public water supply and price	• Per capita abstractions • Abstractions as % of resources (total & internal) • Freshwater abstractions by major uses • Abstractions for public water supply per capita (l/capita/day) • Water prices in major cities, 1996
Forest resource	• Intensity of use of forest resources • Forest and wooded land	• Intensity of use of forest resources (harvest as % of annual growth) • Forest products as % of national exports of goods • Area of forest and wooded land, mid 1990s and trend 1970-95
Fish resources	• Fish catches and consumption: national • Fish catches and consumption: Global and regional	• Trend in fish catches in marine and inland waters • Fish consumption per capita • Trend in fish catches 1980-95 • Fish catches by major fishing areas • World marine fish resource by phase of fishery development
Biodiversity	• Threatened species • Protected areas	• Threatened mammals, birds & vascular plants as % of known species • Total protected area as % of national territory • Protected area by IUCN management categories

Socio-economic indicators

Issue	Indicator area	Indicators
GDP and population	• Gross domestic product • Population growth and density	• GDP per capita • GDP change since 1980 • Structure of GDP (agriculture%, industry%, service%) • Population change since 1980 • Population density • Ageing index pop>64/pop<15 • Unemployment rate
Consumption	• Private consumption • Government consumption	• Private final consumption per capita • Private final consumption structure by type (food & clothing, rent & furniture, health, transport, recreation, other) • Government final consumption per capita • Change since 1980
Energy	• Energy intensities • Energy mix • Energy prices	• Energy supply per GDP, state 1995, trend 80-95 • Energy supply per capita, state 1995, trend 80-95 • Primary energy supply by source • Trends in real energy end-use prices 1980-95 • selected prices for industry and households, mid-90s (light fuel oil, natural gas and electricity)
Transport	• Road traffic and vehicle intensities	• Road traffic per GDP • Traffic per network length

		• Motor vehicles per capita
		• Motor vehicles per network length
	• Road infrastructure densities	• Road network density (km/100 km2)
		• Motorways density (km/1000 km2)
	• Road fuel prices and taxes	• Price excl. tax and tax of diesel fuel, leaded premium and unleaded premium petrol, 1995
Agriculture	• Intensity of use of nitrogen and phosphate fertilisers	• Trends in application of nitrogen fertilisers per km2
		• Trends in application of phosphorus fertilisers per km2
		• Agricultural production
	• Livestock densities	• Livestock densities
		• Nutrients from livestock
	• Intensity of use of pesticides	• Apparent consumption of pesticides per km2, mid 90s and change since 1980
Expenditure	• Pollution abatement and control expenditure	• OECD PAC expenditure by public and business by activity (air, water, waste), mid 90s
	• Official development assistance	• Trends in Official Development Assistance as % of GDP, 1980-96

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IS5: EUROPEAN ENVIRONMENT AGENCY: ENVIRONMENTAL SIGNALS 2001 (EEA, 2001)

SECTORAL INTEGRATION

Major developments in
- Transport (passenger-km)
- Energy use (mtoe)
- Tourism (million tourist arrivals)
- Agriculture (million animals)

Prices subsidies and expenditures:
- Household expenditures on recreation and transport
- Real price of passenger transport
- Real price of motorfuels
- Agricultural support

Indicators for eco-efficiency
- Transport (freight and passenger transport, energy use, emissions of greenhouse gases, acidifying substances, tropospheric ozone precursors)
- Energy supply (gross value added, total output energy supply sector, emissions of greenhouse gases, acidifying substances, tropospheric ozone precursors)
- Agriculture (energy use, irrigated land, gross value added, emissions of greenhouse gases, acidifying substances, tropospheric ozone precursors, consumption of fertilisers, pesticides)

HOUSEHOLDS AND CONSUMPTION PATTERNS

Level and intensity of consumption
- Population, number and average size of households
- Eco-efficiency of household consumption (household expenditures and number of households compared to energy use and CO_2 emissions)
- Household consumption expenditure by sector
- Final household energy and electricity consumption
- Household water consumption by type of use
- Market for organically produced food (% of total and annual growth)

TOURISM

- Total international inbound tourism
- International tourism by mode of arrival
- Trends in number of stays by mode of transport
- Household expenditures on recreation
- Stays in tourism establishments
- Number of second homes
- Numbers of beds and international arrivals
- Current eco-labels for accommodation in Europe
- Number of Blue Flag European beaches

TRANSPORT

- Transport eco-efficiency (freight and passenger transport, energy use, emissions of greenhouse gases, acidifying substances, tropospheric ozone precursors)
- Reduction of NOx emissions from road traffic
- Annual average travel distance (passenger-km per capita per car)
- Average journey lengths by purpose
- Evolution of passenger and freight transport demand, car fleet, population and GDP
- Evolution of modal split in freight transport
- Length of motorways and railways
- Investments in transport infrastructure, total and by transport mode
- Average external costs of passenger and freight transport
- Real changes in the price of passenger transport
- Real average EU prices for motor fuel
- Integrated transport planning and environmental management
- Consumer price indices for transport compared to all items

ENERGY

- Indicators of eco-efficiency of the energy supply sector (gross value added, total output energy supply sector, emissions of greenhouse gases, acidifying substances, tropospheric ozone precursors)
- Reduction of SO2 from electricity generation
- CO2 intensity of conventional thermal electricity generation
- Overall energy and carbon efficiency (related to GDP)
- Electricity consumption per capita
- Total energy consumption by fuel
- Final energy consumption by sector
- Share of renewable energy and CHP in gross electricity consumption/generation
- Generation of nuclear wastes (spent fuel arisings)
- Oil spills above 7 tonnes per spill

AGRICULTURE

- Indicators of eco-efficiency in agriculture(energy use, irrigated land, gross value added, emissions of greenhouse gases, acidifying substances, tropospheric ozone precursors, consumption of fertilisers, pesticides)
- Expenditures under the Common Agricultural Policy (animal, plant, rural development)
- Development in number of land holdings and land use
- Distribution of total number of cattle, and pigs, by number per farm
- Standardised nitrogen surpluses from agricultural land
- Nitrogen surplus
- Area under agri-environmental management contracts
- Spreading of animal manure, by season
- Share of organic farming in total agricultural area

PROGRESS IN KEY ENVIRONMENTAL ISSUES

NB   6th Environmental Action Programme themes: climate change, nature and biodiversity, environment and human health, waste and resources

Climate change

Current: aggregated emissions of three main greenhouse gases
Ideal: aggregated emissions of three main greenhouse gases

Nature and biodiversity
Current: designated 'Special Protection Areas' (Birds Directive)
Ideal: biodiversity index, or conservation status of key species and habitats

Air quality
Acidification
Current: aggregated emissions of acidifying substances
Ideal: same
Summersmog
Current: aggregated emissions of ozone precursor substances
Ideal: same, and number of days of pollution exceeding standards
Urban
Current: number of days of exceedance (several pollutants)
Ideal: urban air quality indicators, or index; urban transport indicators

Water quality
Current: phosphate and nitrate concentration in large rivers
Ideal: European index for the status of water bodies

Chemicals
Current: indicator in development
Ideal: production of hazardous chemicals

Waste
Current: municipal and hazardous waste generated and landfilled
Ideal: resource use in line with the waste strategy

Resource use
Current: gross inland energy consumption
Ideal: material balance indicator

Water quantity
Current: total fresh water abstraction
Ideal: intensity of water use

Land use
Current: land use by selected categories
Ideal: land use change matrix

CLIMATE CHANGE

Change in greenhouse gas emissions since 1990, % change and individual GHG emissions by country

AIR POLLUTION

▪   Limit and threshold values for ambient air quality for different pollutants

- Emission reduction targets for the EU for different pollutants
- Emissions of ozone precursors, and change since 1990 compared with targets
- Exceedance of human health threshold for ozone
- Emissions of primary and secondary fine particulates
- Exposure to fine particles above EC threshold values
- Emissions of acidifying gases, and change since 1990 compared with 2010 targets
- Ecosystem damage area by air pollution
- Contribution of societal sectors to the reduction of air pollutant emissions

RIVER WATER QUALITY

- Nitrate or total oxidised nitrogen concentrations in different sized European rivers
- Distribution by country of nitrates or total oxidised nitrogen concentrations in European rivers
- Nitrate or total oxidised nitrogen concentrations in relation to agricultural land use
- Total ammonium concentrations in different sized European rivers
- Total phosphorus concentrations in different sized European rivers
- Distribution by country of total phosphorus concentrations in European rivers
- Development of oxygen concentration and biota in Rhine
- Dissolved oxygen in rivers
- Distribution of biochemical oxygen demand concentrations in different parts of Europe
- Urban wastewater treatment (% of population)

HAZARDOUS SUBSTANCES IN MARINE WATERS

- Direct and riverine inputs of hazardous substances into the North-East Atlantic
- Atmospheric inputs of cadmium, mercury and lead into the North Sea
- Hazardous substances in blue mussels in the North-East Atlantic (lindane, zinc, lead, mercury, cadmium)
- Percentage reduction in the direct and riverine inputs of hazardous substances into the North-East Atlantic, 1990-98

SOIL CONTAMINATION FROM LOCALISED SOURCES

- Percentage contributions to soil contamination from localised sources
- Expenditure on contaminated site remediation in different countries
- Progress in the management of contaminated sites by country and region

WASTE

- Index for total waste generation
- Total waste generation by sector
- Relation between economic growth and waste generation
- Waste generation for daily household and commercial activities
- Biodegradable municipal waste, total and landfilled as % of total
- Sludge from wastewater treatment, 1992-98
- Treatment of sewage sludge (incineration, recycling, landfilling)

(DRY) GRASSLANDS

Main impacts and activities in grassland areas
Previous land use of recently afforested land
Permanent grassland area
Threatened butterflies according to broad habitat types
Area of dry grassland proposed for protection

Nature and biodiversity
Current: designated 'Special Protection Areas' (Birds Directive)
Ideal: biodiversity index, or conservation status of key species and habitats

TABLES OF POSSIBLE INDICATORS FOR MANUFACTURED, ENVIRONMENTAL, HUMAN, AND SOCIAL CAPITAL TO EVALUATE THE CONTRIBUTION OF THE EU STRUCTURAL FUNDS TO SUSTAINABLE DEVELOPMENT

Manufactured capital

Type of intervention	Stock/flow	
		Indicator
Transport infrastructure (rail, road, airport, port, urban transport, multimodal transport)	Stock	Financial investment in the different categories
Telecommunications infrastructure (ICT, services and applications for the citizen and SMEs)	Stock	Financial investment in the different categories
Energy infrastructure (new plants assisted)	Stock	Financial investment in the different categories

Environmental capital

Environmental theme	Stock/flow	
		Impacts
Climate change	Stock	
	Flow	F1. Increase in CO2 emissions and other GG emissions
Air pollution	Stock	S1. Concentrations of low-level ozone
	Flow	F2. Increase in emissions of main local air pollutants (SOx, NOx, NMVOCs)

Waste	Stock	S2. Solid waste generation (municipal solid waste [MSW] arisings, hazardous waste arisings)
	Flow	F3. % MSW to landfill
		F4. Other improvements in solid waste management (?)
Water pollution	Stock	S3. Concentrations of various pollutants in surface waters
		S4. % coastal sites complying with Bathing Water Directive
	Flow	F5. Emissions of heavy metals
Water consumption	Stock	S5. Water abstraction as % of availability
	Flow	F6. Water consumption
Forest resources	Stock	Forest cover
	Flow	Forest depletion and growth
Fishing pressure	Stock	S5. % stocks fished above MBAL (minimum biologically acceptable level)
	Flow	F8. Reduction in catches of depleted stocks fished (tons by species)
Urbanisation of land	Stock	S6. Greenfield development as % of total new development
	Flow	F9. Area converted from greenfield to developed land
Loss of biodiversity	Stock	S7. % land area protected
	Flow	F10. Loss, damage, fragmentation of protected areas
		F11. Wetland loss though drainage
		F12. Incidence of forest fires
Change of landscape	Stock	S?. % land area with landscape designation
	Flow	F13. Development along coast
		F14. Loss of cultural features
		F15. Loss of areas within which active management of landscape features
Energy	Stock	S8. % renewables as share of power generation
	Flow	F16. Energy consumption
Transport	Stock	S9. % share of passenger traffic by car
		S10. % population exposed to unacceptable noise levels
	Flow	F17. Change in road passenger km

Agriculture	Stock	S11. % agriculture share of land use
		S12. % organic farming in agricultural land use
		S13. Change in number of farms
	Flow	F18. Nitrates per km^2 agricultural land
		F19. Pesticides per km^2 agricultural land
		F20. Agricultural water use

Human Capital

Type of Measure	Stock/ Flow	
		Impacts
Status and Spending with respect to: Education	Stock	- Educational attainment (ISCED levels) broken down by gender and age
	Flow	
Status and Spending with respect to: Training	Stock	- success rate of training (% finding employment on completion)
	Flow	
Status and Spending with respect to: Research & Development	Stock	- Number of patents taken out from innovations being developed
		- Net employment created or safeguarded
		- Brain import/export
	Flow	

Health Status and Spending	Stock	- Life expectancy - Infant mortality - Nutritional status of population - Immunisation against childhood diseases - Exposure to air pollution - Health and environment related health expenditure - Extent of drugs/alcohol abuse - Suicide rates
	Flow	
Labour market conditions (wages, employment and unemployment)	Stock	
	Flow	- Unemployment (male, female, youth etc) - Activity rate (male, female full-time equivalents)
Labour Productivity and Motivation	Stock	- Absenteeism - Worker productivity
	Flow	
Inventiveness and Entrepreneurship	Stock	- Number of start-up businesses - Ratio of entrepreneurs/population
	Flow	
Learning Disadvantage	Stock	- Long-term unemployment
	Flow	

Social Capital

Type of Measure	Stock/ Flow	
		Impacts
Values		
Trust	Stock	- Extent of trust (in local associations, hierarchical organisations, government, scientists) - Fear of crime
	Flow	
Equity	Stock	- Population living below poverty line - Measures of income inequality (gender, age) - Children in poor households - Workless households
	Flow	
Social Health		
Social Integration and Cohesion	Stock	- Voter turnout (male, female, young, retired) - Citizen satisfaction with the local community - Newspaper readership - Access to green spaces - Access to childcare provision, - Access to healthcare - Access to public transport system - Access to internet - Access to retirement homes - Divorce rate - Time spent commuting
	Flow	

Social Exclusion	Stock	- Crime rates
		- Prisoners per 100,000 people
		- Benefits dependency (ratio)
		- Retirement age
		- Extent of homelessness
	Flow	
Social Organisation		
Networks, Horizontal Associations	Stock	- Networks of civic engagement: eg number and types of neighbourhood associations, community groups, cooperatives, sport clubs etc
		- Voluntary groups or number of volunteers
	Flow	
Hierarchical organisations	Stock	- Number and type of organisations (ie good sectoral representation and diversity)
		- Business clusters
		- Survival rates of start-ups
	Flow	
Governance		
Political Arrangements	Stock	- Decentralisation of decision making
		- Participation in planning process
		- Partnerships
		- LA 21 processes
		- Transparency of procedures
		- Length of political procedures
	Flow	
Legal, financial arrangements	Stock	- Length of civil cases
		- Differential interest rates
	Flow	

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