EUROPEAN CATCHMENTS
CATCHMENT CHANGES AND THEIR IMPACT ON THE COAST

Funded by:
European Commission, DG Research
5th Framework Programme
(Contr. No. EVK1-CT-2000-00044)

EUROCAT Deliverable 3.2

REPORT ON THE INSTITUTIONS, STAKEHOLDERS AND POTENTIAL/ACTUAL CONFLICTS OF INTEREST AND VALUES WITHIN A GIVEN CATCHMENT

Compiled by:

Laure Ledoux and Kerry Turner
CSERGE, School of Environmental Sciences,
University of East Anglia, Norwich, NR4 7TJ, UK

Table of contents

1. Introduction

This report is the second deliverable of Working Package 3 of the EUROCAT research project (Scenarios and response/management options). EUROCAT aims to integrate natural and social science to link the impacts affecting the coastal sea to the human activities developed within the catchments. In order to identify differences in catchment-coastal zone systems across Europe, and their relevance for a better management strategy at the catchment level, the project uses regional studies which focus on eight catchments characterised by different environmental and management issues. The institutional and stakeholder analysis reported on in this document is part of a common methodological framework for WP 3, agreed on by all the catchment teams. This methodology, which was fully developed in deliverable 3.1, is summarised in Figure 1.

Figure 1: Socio-economic Conceptual Framework

- **METHODOLOGICAL COMPONENTS AND SEQUENCE**

- **SCOPING ANALYSIS**
  DP-S-I-R framework, common application across all catchments preliminary identification of priority science/policy issues

- **INSTITUTIONAL ANALYSIS**
  Legislation, regulations, institutions across local, national and regional sea spatial scales

- **STAKEHOLDER MAPPING EXERCISE**
  Institutional arrangements, power structures, policy networks relevant to the chosen priority policy issues

- **SCENARIO ANALYSIS**
  Construction of basic scenarios in order to differentiate between worldviews
  - **BAU** - trend future
  - **POLICY TARGETS** - compliance plus future
  - **DEEP GREEN** -environmentalist objectives over the medium term but constrained by technological feasibility (BAT) and social attitudes and cultural changes

Narratives ? policy standards/targets ? policy response packages to be subsequently evaluated via cost-effectiveness and/or multi-criteria analysis.

- **INDICATORS AND CRITICAL THRESHOLD ZONES**

Integrate indicators of environmental change with perceptions of environmental risk and management responses given the uncertainties present in the given policy issue. Within the DP-S-I-R framework integrate indicator sets using ecological integrity and ecological functions and values as a key concepts.

- **LINKING POLICY ANALYSIS TO MODELS**

- **DECISION-SUPPORT ANALYSIS**

The description of catchments through the Driver Pressure State Impact Response (DPSIR) framework (or Scoping Analysis) and the scenario analysis were reported in D3.1. This report, D3.2, focuses on two steps of the general methodology described in Figure 1: the institutional analysis, and the stakeholder analysis (or stakeholder mapping).

In the institutional analysis an empirical description and explanation is required covering the relevant policy context and regulatory regime that is to form the focal point of the research within any given catchment. The regulatory regime work where necessary, will need to encompass both regional/national and international regulations and designations and their implications for the catchment. Particular attention should be paid to the EC Water Framework Directive. This partly overlaps with D3.1, which is the report on relevant national and international treaties and regulations, and this report refers to the relevant sections of D3.1 where necessary.

At the core of the socio-economic analytical framework is the process of stakeholder mapping. For a given catchment it is necessary to identify the following:

- the different 'interest' groups within the catchment and outside (national and international) that are relevant to the policy issues and contexts being focussed on;
- existing stakeholder networks (or the lack of networks);
- existing institutional arrangements and 'power' structures; and
- the aggregate 'policy networks' (or the lack of networks) that serve to influence policy choice outcomes.

This stakeholder-related information should then be set against the relevant drivers and pressures of environmental change in the catchment (from the DP-S-I-R data) e.g. population growth and density changes, pollutants and contaminants trends, climate change etc. etc. The findings should help, among other things, to highlight any distributional equity concerns (i.e. who gains who loses) and power relationships relevant to existing policies and future potential policy measures. The policy set should include any national, EC or other international regulations, designations and agreements. All this information will be relevant to the outputs from the futures scenarios and policy goals and measures research, to which we turn in the next sub-section of this report.

The following sections report on different levels of relevant analysis carried out in the EUROCAT catchments, bearing in mind the different geographical and institutional contexts.

2. Institutional Analysis

2.1. AXCAT

Fundamental changes have occurred in our understanding of the functions and values of catchments, and these have prompted many recent international efforts to protect and sustainably use them. Today, these efforts are coordinated through a number of international protocols and agreements, the implementation of which requires concerted action, joint fund raising and mutual cooperation in catchment management and policy. A relatively large number of legal documents are directly or indirectly affecting the management of land, water and natural resources in the Axios catchment area. They are categorized in four sections (See deliverable D1.3): National framework (national laws, Ministerial Decisions, Prefecture Decisions, etc), Common European framework (Directives) and international (including bilateral) agreements and conventions.

On a European scale, the recent Water Framework Directive (WFD) stands prominently in offering tools in support of an integrated management of watersheds. In this context, adopting the "wise use" imperative of the European Union is a prerequisite, as is also taking explicitly into account a number of factors considered to affect specifically the management of Mediterranean catchments: a) developmental needs and economic inequality, b) pressure from population growth, immigration and mass tourism, and c) social and cultural conflicts.

The socio-economic setting defining the relevant institutions in the Axios catchment are: the political situation in the Balkans, Greek development policy for the area and the citizen's life-style driven by major EU /national legislative framework. The major socio-economic drivers that affect the total Axios catchment's area (FYROM and Greece) can then be summarized as follows:

a. The wider political and economic destabilization of the Balkans region leading to uncertainty, inhibition of the rate of growth, and lack of sufficient effort to tackle environmental degradation, as well as the influx of 261.000 refugees in FYROM.

b. The new Greek Development Strategy for the role of Thessaloniki as the new Metropolitan center of the Balkans (Balkan and Black Sea area Cooperation Pole)

c. The European Union Policies, especially the Common Agricultural and Fisheries Policies, the Water Framework Directive, the Habitat Directive

Concerning the destabilization of the Balkans region: the Kosovo conflict placed an additional burden (UNEP 2000) on the already over stretched resources of FYROM, although the direct environmental impacts of the influx of 261.000 refugees were found to be minimal. With regard to UNEP's conclusion two key areas of environmental improvement emerged for the State of FYROM:

- The implementation of environmentally acceptable industrial processes, including measures for adequately controlling the use of chemicals
- Adequate handling, storage, treatment and disposal of waste, whether solid or liquid, hazardous or non- hazardous, municipal or industrial.

UNEP identifies a chronic lack of investment in environmental protection although the economic context of the last decade in FYROM has led to decreased industrial output and consequential reductions in pollution (Industry is the dominant sector accounting for about 35% of the Gross Social Product (GSP) and 39.9% of employment in 1994, NEAP Report).

According to the new Greek development policy for the period 2000-2006, the General Development Goal for the Region is the utilization of the new metropolitan role of Thessaloniki in the Balkans area, along with the reinforcement of intra-regional balance and sustainability. The main strategic objectives for achieving this goal are the following (Konsolas et al 2002):

A) Development of Thessaloniki into a metropolitan center with international functions. Emphasis is placed on the areas of transportation- communication, culture, urban infrastructure, infrastructure and services for enterprises. Actions include the creation of an integrated trans-modal transportation network with transportation hubs in major concentration points of production activity and their connection with trans-European and inter-regional transport networks.

B) Protection and utilization of natural environment. The focus is on: (a) urban and industrial waste adopting measures for combating inner water and coastal pollution and completion of infrastructure for treatment of liquid and solid waste; (b) management of natural and anthropogenic environment with special actions for rational management of water resources and their protection from unsuitable cultivation practices; together with design and implementation of integrated protection programmes for biotopes and wetlands

C) Reduction of intra-regional disparities and sustainable development. Emphasis is placed on upgrading of health services, modernization of railway network, improvements in infrastructure of regional sea ports, promotion of local production through agriculture and agro industrial restructuring in the region's plains, modernization and development of fishery and stock raising, reinforced protection and preservation of agricultural land.

D) Reduction of unemployment and provision of equal opportunities in education and skills, with particular emphasis on integrated employment programs for emigrants, repatriates and socially excluded groups to enter the labor market.

Within the third Community Support Framework 2000-2006, the Central Macedonia Funding Program, which will finance the above-mentioned actions, has a total public expenditure of 1.2 billion Euros. The Republic of Macedonia is in a period of transition as it moves towards a market-based economy. Within this framework it is apparent that FYROM is seeking to make progress in the field of environmental protection and is also very keen to comply with EU environmental requirements and standards (NEAP Report). Nevertheless the adoption of new environmental legislation and the creation of new institutional structures by FYROM, need to be supported by investment, implementation and enforcement. Specific environmental management recommendations given by UNEP for the water sector in FYROM include the following: 'an integrated river basin management plan should be developed and implemented for the Vardar (Axios) River. The approach should be

consistent with the EU Water Framework Directive and take full account of trans-boundary considerations'

2.2. HUMCAT

2.2.1 International legislation and regulations

There are a number of international agreements and conventions that are relevant to the North Sea in general, and the Humber in particular. These were detailed in D 1.3, and are summarised in Figure 2. The most relevant aspects are highlighted here. The Humber is one of the major contributors of fresh water from the UK to the North Sea, together with significant loads of nutrients and contaminants. As such, its outflow has been scrutinised under the terms of the Oslo and Paris Conventions and subsequent North Sea Conferences. The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) was opened for signature in 1992, and came into force in 1998 (see http://www.ospar.org/). The parts of the convention most relevant to the Humber are those that deal with the prevention and elimination of pollution from land-based sources to the North Sea, and with the prevention and elimination of pollution by dumping or incineration.

A number of EU directives are also directly relevant to the HUMCAT study. Again, these were detailed in D 1.3 and are summarised in Table 1 and Figure 2. Of particular importance is the Water Framework Directive. The Water Framework Directive is a major example of policy response addressing water quality issues at the catchment scale. Adopted in June 2000, it integrates previously existing water legislation, updates existing directives according to new scientific knowledge, and strengthens existing legal obligations to ensure better compliance (Kaika and Page, 2002). Kallis and Butler (2001) point out that the directive introduces both new goals, and new means of achieving them (new organisational framework, and new measures). The overall goal is a "good" and non-deteriorating "status for all waters (surface, underground and coastal). Measures to achieve the new goals will be co-ordinated at the level of river basin districts, i.e. hydrological units and not political boundaries. Authorities should set up River Basin Management Plans, to be reviewed every 6 years, based on identifying river basin characteristics, assessing pressures and impacts on water bodies following future trend scenarios, and drawing on an economic analysis of water uses within the catchment (including a cost-effectiveness analysis of potential measures). Monitoring is also an essential component, determining the necessity for additional measures. Finally, an important innovation of the Directive is to widen participation in water policy-making: river basin management plans should involve extensive consultation and public access to information.

The main "response" element of the directive is the programme of measures. "Basic" measures should be incorporated in every river basin management plan, at a minimum including those required to implement other EU legislation for the protection of water (see figure 1). Furthermore, Member States should follow the principle of full cost recovery of water services, ensuring that water pricing policies are in place to "provide adequate incentives " for efficient use of water.

Although it does not target coastal zones specifically, the Directive does cover coastal water quality in its objective for good quality status, and provides a good example of integrated catchment management, addressing in particular the issue of diffuse pollution of coastal waters. A major part of the research within HUMCAT is relevant to the implementation of the directive: e.g. the scenarios analysing potential future fluxes of contaminants; the cost-effectiveness and multi-criteria analysis of potential policy measures to improve water quality, and the involvement of stakeholders throughout the project.

The Habitats Directive also has major implications in the Humber estuary. The Habitats Directive is the main element of response of the EU to the convention on biodiversity (Ledoux et al, 1999). Together with the Birds directive, it aims to create a network of designated areas (Natura 2000) to protect habitats and species of community-wide importance, on a biogeographical basis. It is, in effect, a "no-net-loss" policy, in so far as it requires all Natura 2000 areas to be protected from deterioration and damage. The Member States are required to take all appropriate steps to avoid the deterioration of those habitats and species for which protection is required. Under articles 6(3), a plan or project likely to have a significant effect on a Natura 2000 site must undergo assessment to determine whether it would damage the nature conservation interest of the site. If the plan or project is thought to impose a significant threat, it can only go ahead if (1) there is *no alternative solution;* (2) its implementation is of *overriding public interest*; (3) member states must provide compensatory measures which may include habitat restoration or recreation of the same type of habitat on the same site or elsewhere.

A significant number of habitat types listed in Annex II of the Directive are located in the coastal fringe (dunes, mud flats, coastal lagoons, coastal freshwater wetlands, etc.). In addition, the Habitats Directive specifically establishes Marine Special Areas of Conservation. The Habitats Directive can therefore be expected to have a major impact on the coast. In its strict interpretation, the compensation requirement for displaced habitats also applies to habitats lost through natural, or semi-natural causes, such as sea level rise and coastal erosion, which is likely to have far reaching consequences given the current climate change predictions. In the Humber, relevant authorities are anticipating this need for compensation and are planning ahead by recreating coastal habitats through managed realignment – realigning existing hard defences further inland thereby recreating intertidal habitats (Crooks and Ledoux, 1999; Ledoux et al, 2000).

Finally, under the Urban Waste Water Directive (UWWD), water companies will also have the responsibility of increasing waste water treatment to meet more stringent nutrient standards in receiving waters. The degree of treatment required is normally secondary treatment, although primary treatment might be allowed in "less sensitive areas". In this context, the EC has announced infraction proceedings against the UK government for failing to designate the Humber as a sensitive area. The degree of waste water treatment required in the Humber will eventually depend on the result of this case.

Table 1 : European Directives affecting the Humber

Directive	Area of concern
2000/60/EC	Water Framework Directive, establishing a framework for Community action in the field of water policy
92/43/EEC	Habitats Directive on the conservation of natural habitats and of wild fauna and flora
91/676/EEC	Nitrates Directive on protection of waters against pollution caused by nitrates from agricultural sources.
91/271/EEC	Urban Waste Water Treatment Directive
90/313/EC	Directive on the freedom of access to information on the environment
80/778/EEC	Drinking Water Directive – substance limits in water abstracted for drinking
80/68/EEC	Directive on the protection of groundwater against pollution caused by certain dangerous substances
79/923/EEC	Shellfish Waters Directive
79/409/EEC	Conservation of Wild Birds Directive
78/659/EEC	Directive on the quality of fresh waters needing protection or improvement in order to support fish life
76/464/EEC	Discharges of Dangerous Substances Directive on pollution caused by certain dangerous substances discharged into the aquatic environment
76/160/EEC	Bathing Water Quality Directive
75/440/EEC	Directive concerning the quality required of surface water intended for the abstraction of drinking water

Although it is not strictly speaking legislation, it is also worth mentioning that the European Union has recently developed a European strategy on coastal zones. A three-year demonstration programme on integrated coastal zone management led to a European Commission Communication entitled "Towards a European Integrated Coastal Zone Management (IZM) Strategy. General principles and Policy Options. A reflection Paper » (EC, 1999), and a proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (COM/00/545 of 8 Sept. 2000). The European Parliament and Council adopted this recommendation in 2002 (2002/413/EC).

The Strategy defines Integrated Coastal Zone Management (ICZM) as a "dynamic, continuous and iterative process designed to promote sustainable management of coastal zones (EC, 1999). Following on from the conclusions of the demonstration programme, the ICZM Strategy recommends: (i) promotion of ICZM within the member States and at the "Regional Seas" level; (ii) making EU policies compatible with ICZM; (iii) promoting dialogue between European Coastal Stakeholders; (iv) developing best ICZM practice; (v) generating information and knowledge about the coastal zone; (vi) disseminating information and raising public awareness. The Strategy also warns that because of the diverse physical, economic, cultural and institutional characteristics of Member States, the response adopted should be flexible

and problem-oriented. The philosophy underpinning the strategy is one of governance by partnership with civil society, with the EU providing leadership and guidance to support implementation at other levels. Where relevant, the Strategy builds on existing instruments and programmes, which often have not been necessarily designed with coastal zones in mind.

The Recommendation of the European Parliament and of the Council resulting from the European Commission's communication recommends that Member States take a strategic approach to the management of their coastal zones based on: (i) the protection of the coastal environment, following an ecosystem-based approach; (ii) the recognition of the threats of climate change and sea level rise to coastal zones; (iii) appropriate and ecologically responsible measures; (iv) sustainable economic opportunities and employment options; (v) a functional social and cultural system in local communities; (vi) adequate accessible land for the public; (vii) the maintenance or promotion of cohesion in the case of remote coastal communities; (viii) improved coordination of the actions of all relevant authorities, both at sea and on land. Member States should conduct or update an overall stocktaking to analyse which major actors, laws and institutions influence the management of their coastal zone. Based on the result of this stocktaking exercise, Member States should develop a national strategy, or where appropriate several strategies, following the principles of ICZM as described in the European Strategy. These strategies might be specific to the coastal zone, or be part of a geographically broader programme for promoting integrated management of a wider area, and should include a number of steps (see text box).

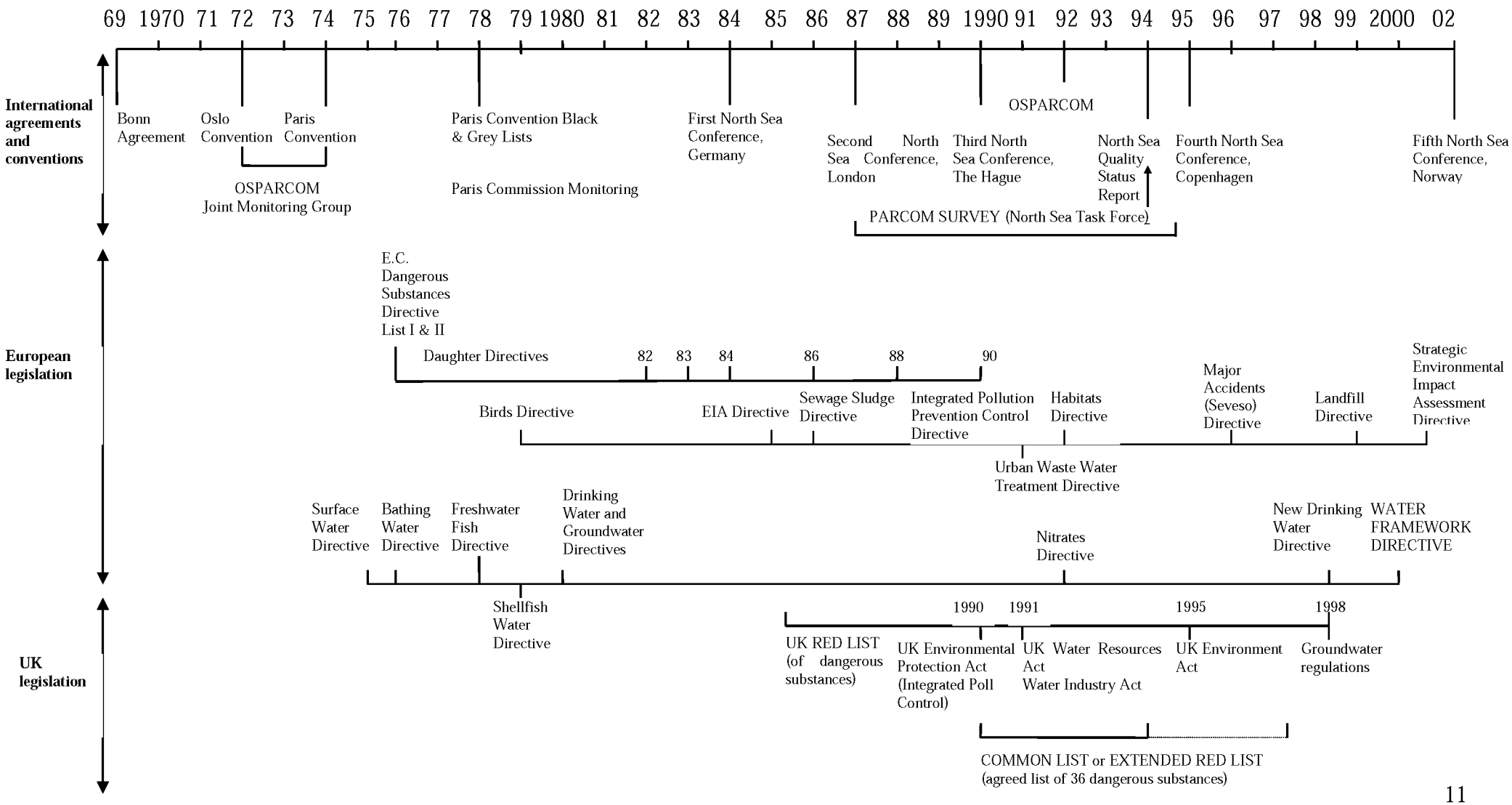
National Strategies for ICZM (OJEC L 14, pp 24-27)

National strategies should:

- Identify the roles of the different administrative actors whose competence includes activities or resources related to the coastal zone; as well as mechanisms for their coordination.
- Identify the appropriate mix of instruments for implementation of ICZM principles. In particular Member States should consider:
  - developing national strategic plans for the coast;
  - land purchase mechanisms and declarations of public domain;
  - developing contractual or voluntary agreements with coastal zone users;
  - harnessing economic and fiscal incentives;
  - working through regional development mechanisms.
- Develop or maintain national/regional/local legislation or policies and programmes addressing marine and terrestrial areas together.
- Identify measures to promote bottom-up initiatives where needed, and examine how to make best use of existing financing mechanisms both at European and national levels.
- Identify mechanisms to ensure full and coordinated implementation and application of Community legislation and policies that have an impact on coastal areas.
- Include adequate systems for monitoring and disseminating information to the public about their coastal zone.
- Determine how appropriate national training and education programmes can support implementation of ICZM principles in the coastal zone.

The Commission is to review this Recommendation within 55 months following the date of its adoption and submit an evaluation report accompanied if appropriate by a proposal for further Community action.

Figure 2: Evolution of the institutional and policy regime relevant to the North Sea and the Humber



2.2.2. National level

Major UK legislation affecting the Humber

The Humber Estuary Management Strategy (HEMS) identifies a long list of national legislation affecting the HEMS area. The most recent and influential elements of this are (see also Figure 2):

- The Environmental Protection Act 1990 - established statutory provisions for environment protection purposes including integrated pollution control for dangerous processes.
- The Water Resources Act 1991 - consolidated previous water legislation in respect of both the quality and quantity of water resources.
- The Water Industry Act 1991 - consolidated legislation relating to the supply of water and the provision of sewerage services.
- The Environment Act 1995 - established the Environment Agency, and introduced measures to enhance protection of the environment, including further powers for the prevention and remediation of water pollution.

Institutions with responsibility for water quality

The Water and Land Directorate of the UK Department of Environment, Food and Rural Affairs (DEFRA) is responsible for all aspects of water policy in England, including water supply and resources, and the regulatory systems for the water environment and the water industry. DEFRA is responsible for :

- drinking water quality
- the quality of water in rivers, lakes and estuaries
- coastal and marine waters
- sewage treatment; and
- reservoir safety.

DEFRA also co-ordinates marine environment policy, including international agreements on the North East Atlantic and the North Sea.

The UK Environment Agency manages water resources for DEFRA, and enforces water quality standards through its regional offices. It is the central body with responsibility for long-term water resources planning in England and Wales. It has a duty to conserve, augment, redistribute and secure the proper use of water resources in England and Wales. Other relevant responsibilities include: flood defence on main rivers, water quality, waste minimisation in certain regulated industries, fisheries, navigation on some rivers.

Private water companies provide public water supply in England and Wales. The Environment Agency regulates their water abstraction and effluent discharges. The Water companies around the Humber estuary include Yorkshire Water, Severn Trent Water and Anglian Water.

The Office of Water Services (Ofwat) is responsible for economic regulation of the water industry. The Director General reviews water company prices to customers every five years.

The authorities responsible for coastal management are covered in section 3.2.2, along with an analysis of institutional arrangements and power structures.

2.2.3. Regional and local level

Regional Government

The UK is divided into 12 administrative regions, one each for N. Ireland, Wales and Scotland, and 9 for England. Within each region there are a number of Local Authorities (LA) e.g. 20 in the Yorkshire and Humber Region, and each LA is divided into a number of Electoral Wards. The Humber catchment includes all of the Yorkshire and Humber region, most of the East and West Midlands regions, and 5 LAs from the South-West region. Each region of the UK hosts a Government Office, which provides the link between national government, and local government. There is a government-sponsored Rural Development Programme for England, divided by region, which aims to provide help for farmers, other rural businesses, and rural communities to become more competitive, diverse, flexible and environmentally responsible. There is also a Regional Development Agency (RDA) for each region, set up in England by Act of Parliament in 1998. Their purpose is to co-ordinate regional economic development and regeneration, in order to enable the various regions to improve their relative competitiveness, and reduce the imbalances that exist within and between regions. Each RDA region is sub-divided into counties.

The two RDAs covering the Environment Agency's North East region (One NorthEast and Yorkshire Forward) have developed regional economic strategies.

Strategic and local planning authorities are responsible for the land use planning framework and planning decisions. Water resources have been the subject of much interest and concern in the recent round of revisions to Regional Planning Guidance (RPG) in the North East and for Yorkshire and the Humber. Many planning authorities are proposing to review their Development Plans to reflect the guidance of the RPGs (EA, 1991).

There has been a multitude of management plans at different levels and scales in the Humber. These are summarised in Table 2. Table 3 provides an overview of major research programmes which have focused on the Humber. These have produced a wealth of data, which are directly relevant for the Humber Study.

Table 2: Management Plans for the Humber

Management Plan	Main Organisations involved	Scope of Plan	Date
HE Quality report	Env. Agency (EA)	Quality of Water	1994
HE Catchment Management Plan	NRA/EA	On-going review of all EA Humber projects	1994 -
HE Action Programme	Humberside County Council	Humber-related issues	1995
HE Action Plan	Env. Agency	Management Issues	1996
HE Coastal Authorities Group (HECAG)	EA, EN, MAFF,EYRC NE Lincs Council	Partnership approach to shoreline management	Draft not yet adopted by ERYC
HE Shoreline Management Plan (HESMP)	HECAG	Flood Defence, Land Use, Nature Conservation, Port Development	1997
East Coast SMP	ACAG	Management Issues	1997
HE Tidal Defence Study	Env. Agency	Flood defence	1997
HE Management Strategy (HEMS)	Public, private and voluntary bodies, inc. Local Authorities	All estuary-D13 related issues	1997
HE Biodiversity Action Plan (BAP)	As HEMS above	Ensure local targets for species and habitats	Draft
Humber Local Environment Agency Plan (LEAP)	EA, LAs, EN, plus consultees as per HEMS	Flood Defence, water catchment management	1999
Coastal Habitats Management Plan (CHaMP)	EA, EN	Considers the implications of the Habitats Regulations only. Will then inform SMPs, which take account of a wider range of factors.	Pilot studies underway in other areas. Not yet adopted for the Humber
Humber Ports and Estuary Strategy	Associated British Ports (ABP)	Port project development and environmental enhancement	Adopted.
English Nature Agenda and Commitment	English Nature		
England Rural Development Programme	DEFRA	Regional Economic Strategy	
Humber Forum	ER of Yorks.Council Hull City Council North Lincs Council NE Lincs Council Humberside Training & Enterprise Council	Strategic Framework for EconomicDevelopment in the Humber Sub-region	1999

Key :

DEFRA	Dept. of Environment, Food and Rural Affairs
EA	UK Environment Agency
EN	English Nature (non-governmental organisation)
EYRC	East Riding of Yorkshire Council
HE	Humber Estuary
LA	Local Authority
MAFF	Ministry for Agriculture, Fisheries and Food, now DEFRA
NRA	National Rivers Authority (now part of EA)
SMP	Shoreline Management Plan

Table 3: Research programmes on the Humber

Research Programme	Time Period	Institute/ Organisation	Project description / dataset
UK River Gauging Station Network	1960s-present	Environment Agency,	River Flow & catchment rainfall, National River Flow Archive
Land Ocean Interaction Study (LOIS) (UK contribution to LOICZ)	1992-1998	Natural Environment Research Council (NERC)	To quantify and simulate fluxes & transformations of sediments, nutrients & contaminants into and out of the coastal zone, extending from the catchment to the edge of the continental shelf
Humber Wetlands Project	1992-	English Heritage Uni.s of Hull & Essex	Archaeology of Humber Wetlands
Lowland catchment Research (LOCAR)	1999-2006	NERC	Measurement and modelling of water and material fluxes through riparian and wetland habitats
Fate & impact of persistent contaminants in estuaries and coastal waters	1998-	EA, Univ. of Plymouth, Liverpool	Generic 3-D computer model, as a pollution information system
URGENT –Urban regeneration and the Environment	1999-2006	NERC Thematic Prog. in partnership with city authorities, industry and regulatory bodies	Integrating ecological, urban and environmental research across the geological, terrestrial, freshwater and atmospheric sciences
DEFRA/EA Estuaries Research Programme	1999-2000 2002-	EMPHASYS Consortium	Phase1 - Prediction of estuary morphology Phase 2

2.3. IDRICAT

The Ministry of the Environment, Spatial Planning and Energy is responsible for environment at state level. The Ministry has the following main offices:

- Office for the Environment
- Office for Water Management
- Office for European Affairs and International Relations
- Office for Spatial Planning
- Energy Office.

The Agencies at the Ministry are shown in Figure 3. At local level the Ministry shares responsibility with municipalities. According to such an organisation the Ministry has local offices throughout the country.

Most relevant legislation associated with water protection is:

- Environmental Protection Act, Official Gazette 32/93 and 1/96
- Decree on emission of pollution and thermal burden, Official Gazette 35/96
- Decree on monitoring of wastewater, Official Gazette, 35/96
- Decree on discharging effluents from municipal wastewater treatment plants, Official gazette 35/96, 90/98, 31/2001

- Decree on emission of pollutants from animal farms, Official gazette, 10/99, 7/2000
- A number of Decrees on emission of pollutants from different industries issued since 1996
- Regulation on drinking water, Official Gazette 46/97, 52/97, 54/98
- Nature Conservation Act
- Urban Waste Water Directive, 91/271/EEC, 98/15/EC
- Drinking Water Directive, 80/778/EEC, 81/858/EEC, 90/656/EEC, 91/692/EEC
- Sewage Sludge Directive 86/278/EEC
- Ground Water Directive 80/68/EEC, 90/656/EEC, 91/692/EEC
- Nitrates Directive, 91/676/EEC
- Surface Water for the abstraction of Drinking Water, 75/440/EEC, 79/869/EEC, 90/656/EEC, 91/692/EEC
- Water Framework Directive, Official Gazette 60/2000
- Bathing Water Directive, 76/160/EEC
- NEPP, Official Gazette 83/99
- GEF – Danube River Basin Pollution Reduction Programme, 1998
- Protection and Sustainable Use of Waters, Recommendations to ECE, UNO, 1995

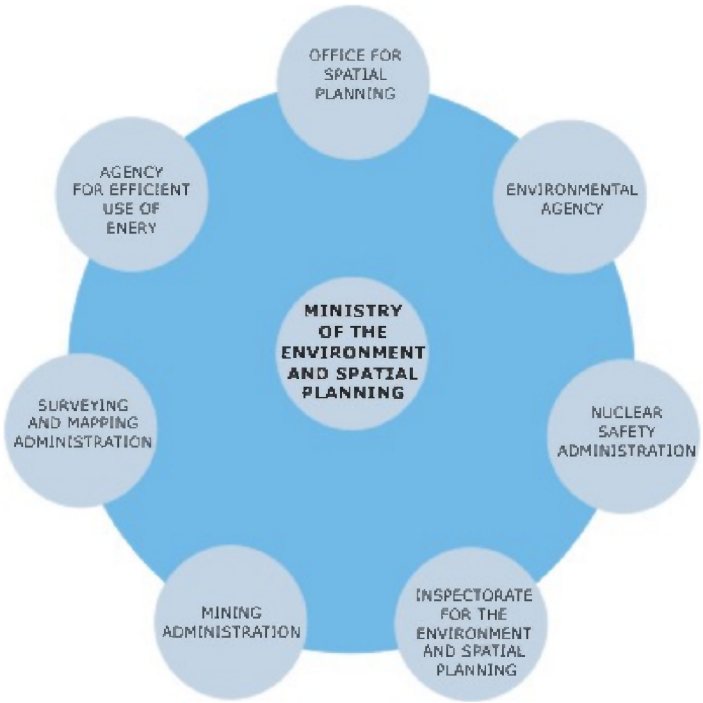


Figure 3: Agencies of the Ministry

Conventions:
- Convention on the Transboundary Effects of Industrial Accidents
- Convention on Environmental Impact Assessment in a Transboundary Context
- Convention on Biological Diversity
- Übereinkommen zum Schutz der Alpen
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar)
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
- Convention on the Prevention of Marine Pollution from Land-based Sources
- International Convention for the Prevention of Pollution from Ships, 1973
- Convention for the Protection of the Mediterranean Sea against Pollution
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes
- Convention on Public Participation, Access to Information and Access to Justice in Environmental Matters
- European Landscape Convention

Based on these the priority list of investments in water sector was identified referring particularly to criteria of the Urban Waste Water Directive and Drinking Water Directive, combined with the criteria of other corresponding EU Directives dealing with water quality in the scope of Water Framework Directive, signed Conventions and International Agreements.

The main prioritisation criteria defined by Action Plans are the following:

- protecting surface water and groundwater aquifers serving as sources for drinking water;
- protecting waters especially sensitive to eutrophication (e.g. lakes and reservoirs, Coastal Adriatic Sea – Trieste Golf);
- limiting discharges of wastewater directly to nature lakes, wetlands and other nature and biodiverse protected aquatic environment;
- protection of bathing waters;
- protection of fish and shellfish waters;
- protection of transboundary waters.

The Ministry of the Environment, Spatial Planning and Energy is determined to fully impose the National Programme on Environmental Protection in which water protection is one of the top priorities.

<u>Background of the National Programme</u>
- 53% of inhabitants are connected to municipality sewage systems
- sewage systems leak-groundwater pollution
- 30% of inhabitants are connected to waste water treatment plants, 15% of waters are biologically treated
- sewage systems are not secured against flooding
- eutrophication of natural and artificial lakes and potential eutrophication of water flows

- lack of general approach to pollution reduction and cooperation of different sectors (industry, farms)

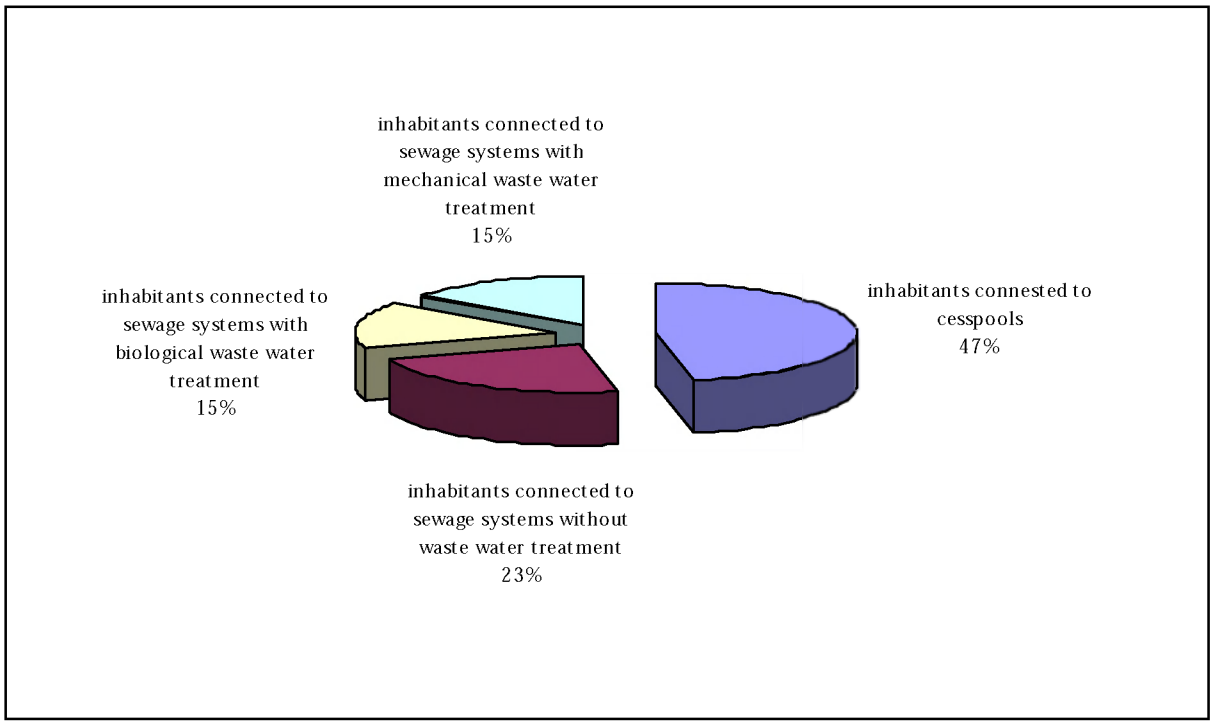


Figure 4: Shares of sewage systems in Slovenia (source: National programme on Environmental Protection)

Funding:
Optional financial sources for water distribution program and investment executions are as follows:
-state budget for municipal infrastructure development
-water pollution taxes
-local community budget
-long-term ecological reservations
-EU funding for associate members for EU legislation implementation
-PHARE Cross Border Cooperation (CBC) programme
-PHARE Large Scale Infrastructure Facility (LSIF) programme
-PHARE National programme
-ISPA fund
-Private sector investments

Suitable projects for funding are those that aim at achieving water quality objectives by one or more of the following:

- Industry:
  - construction, restoring and upgrading of industrial sewer systems and wastewater treatment plants;
  - upgrading of industrial processes with BAT to minimise toxic/nutrient release;
  - expansion of discharging facilities;

- proper storage, treatment and disposal of hazardous substances;
- prevention of water pollution from landfills.
- industrial retrofitting to optimise feed stock inputs and minimise process waste

- Agriculture:
  - proper treatment of wastewater discharges by farms;
  - construction of wastewater treatment plants;
  - re-use / recycling of agricultural waste

- Municipalities
  - construction of wastewater treatment plants
  - construction/extension/renovation of sewage systems.

In addition, eligibility criteria are designed to enable identification and verification of investments, which need to achieve one or more of the following:

(a) a reduction in transboundary water pollution associated with nutrient/biodegradable sources and selected priority substances when appropriate;
(b) produce environmental benefits that are greater than those resulting from compliance with national/EU requirements by
  i. speeding up the implementation of environmental investments (i.e., before prescribed by legislation); and/or
  ii. going beyond national/EU standards; and/or
  iii. are in line with long-term, i.e., strategic goals of environmental quality and health;
(c) demonstrate innovative technologies; and
(d) be consistent with relevant international conventions and strategies.

Possible funding problems:

- municipal services prices are still not determined in an EU manner
- no assurance of polluting taxes income
- internalisation of external costs is too slow
- local communities are limited in borrowing money (up to 10% of community budget)

Problem solution:

- co-ordination in water distribution and waste water treatment planning and execution between institution management on a state and local scale
- co-ordination in water distribution and waste water treatment planning and execution between administrative institutions (local communities) and public companies on a local scale for each river basin
- co-ordination in water distribution and waste water treatment planning and execution in connection with landscape planning
- expert assistance by investment program preparations for external funding acquirements
- regular supervision and maintenance of water distribution and waste water treatment systems

- management education

Implementation of technical measures

Criteria for priority list determination:

1. Urban Waste Water Directive (91/271/EEC, 98/15/EC):
   -pollution decrease by building sewage systems:
   -in sensitive areas with more than 10000 PE by the end of 2008
   -in areas with more than 15000 PE by the end of 2010
   -in areas between 2000 PE and 15000 PE by the end of 2015

   - pollution decrease by biological waste water treatment:
   -in areas with more than 15000 PE by the end of 2010
   -in areas between 10000 PE and 15000 PE by the end of 2015
   -in sensitive areas between 2000 PE and 15000 PE by the end of 2015
   -in areas between 2000 PE and 10000 PE by the end of 2017

   -pollution decrease by denitrification and dephosphatisation in waste water treatment:
   -in areas with more than 10000 PE by the end of 2008
   -in areas with less than 2000 PE by the end of 2015

Drinking Water (80/778/EEC), (81/858/EEC), (90/656/EEC), (91/692/EEC), Ground Water (80/86/EEC), (90/656/EEC), (91/692/EEC) and Surface Water for the Abstraction of Drinking Water (75/440/EEC), (79/869/EEC), (90/656/EEC), (91/692/EEC) determine in priority:

1. Third level waste water treatment in areas of drinking water abstraction
2. Third level waste water treatment according to EU directives: Dangerous Substances to the Aquatic Environment (76/464/EEC), Mercury discharges from Chlor-alcali Industries (82/176/EEC), Cadmium Discharges (83/513/EEC), Other Mercury Discharges (84/156/EEC), HCH Discharges (84/491/EEC), List of substances (86/280/EEC)
3. Assurance of adequate water quantities

Urban Waste Water Directive (91/271/EEC, 98/15/EC) and Nitrates Directive (92/43/EEC):

Third level wastewater treatment in areas with expected eutrophication

Habitats Directive (92/43/EEC), Shellfish Directive (79/923/EEC, 91/692/EEC) and Fish Water Directive (78/659/EEC):

Third level waste water treatment in protected areas (swamps, areas of vast biological diversity)

Water Framework Directive (COM/97):

General wastewater treatment from different sources (municipal wastewaters, livestock farm wastewaters, industry wastewaters)

Criteria of international conventions:

-Treatment of waste waters with large environmental impact
-optimal water use for different purposes

Pollution decrease by establishment of general water distribution systems in areas with existing investment programs.

Table 4: Classification of surface water areas considering previously listed criteria

SENSITIVE (ENDANGERED) AREAS
Euthrophication areas (natural lakes, coastal waters)
Water sources (alluvial and karst aquifers)
Swamps, areas of vast biological diversity
Surface waters (swimming)
POTENTIALLY SENSITIVE (ENDANGERED) AREAS
Areas of expected eutrophication (artificial damning)
Border water flows
Areas of intense industry and farming (livestock)
Water flows with low water quantities (low self-cleaning ability)
NON-SENSITIVE AREAS
Water flows with high water quantities (high self-purification ability)

Priorities among priorities:

- preparation of general programs for municipality emissions decrease and optimal water consumption in certain river basin
- preparation of basis for determination of drinking water safety zones
- preparation of improvement programs for potentially threatened ground water sources
- settings of technical parameters of polluters for cadastre management
- education of managers and maintenance workers

Investment execution:

- preparation of suitable documentation for investment execution of:
  - -construction and reconstruction of sewage systems
  - -construction of waste water treatment plants
  - -cesspool sanitation
  - -renewal and construction of water distribution systems in water-scarce areas
- investment execution in accordance with priority lists
- management and maintenance of investments

2.4. POCAT

The Environmental Institutions of Po Catchment

In the Po area there are many public institutions which have administrative responsibility regarding the water quality. The principal Institutions are:

- the "Autorità di Bacino del Po" (ABP, Po River Basin Authority);
- the Regional Councils;

- the "Ministero dell'Ambiente e della Tutela del Territorio";
- the "Agenzia Nazionale Protezione Ambientale" (ANPA, National Environmental Protection Agency).

Finally there are the agencies for the environmental protection of the regions and provinces involved:

- Regional Environmental Protection Agency (ARPA- Agenzia Regionale per la Protezione Ambientale)
- ARPA Veneto
- ARPA Emilia Romagna
- ARPA Lombardia
- ARPA Piemonte
- ARPA Liguria
- ARPA Valle d'Aosta
- APPA Provincia Autonoma di Trento.

The Councils of Provinces are responsible for some local aspects.
Table 5 shows the competence areas of these institutions:

Institution	Catchment	Coast	Sea
ABP	X		
Regional Councils	X	X	X
ARPA Veneto	X	X	X
ARPA Emilia Romagna	X	X	X
ARPA Piemonte	X		
ARPA Liguria	X		
APPA Trento	X		
ARPA Valle d'Aosta	X		
Ministero dell'Ambiente e della Tutela del Territorio	X	X	X
ANPA	X	X	X

Table 5: Institutional competence areas

The Po River Basin Authority

The **L. 183/89** (**art.12**) defines the basin authorities referring to all the drainage basin having a national influence. In particular the art. 14 of this law defines the Po River as a national relevance basin.
The Po River Authority was introduced by **L. 183/89**: it is a joint body in which national and regional authorities are represented.
The Po River Authority is composed by:

- an Institutional Committee;
- a Technical Committee;
- a General Secretary;
- a Technical-Operational Secretary

Institutional Committee is composed by *Ministero dei Lavori Pubblici*, *Ministero dell'Ambiente e della Tutela del Territorio and Ministero per i Beni e le Attività*

Culturali. The committee also includes also all the regional presidents involved in the hydrographical basin and the general secretary.

The Po Basin Authority was founded in 1990 to safeguard and manage the development of related catchments; it is composed by seven Regions and the territory extending from the Monviso mountain to the Po river Delta.
The areas involved are the Liguria, Piemonte, Valle d'Aosta, Lombardia, Emilia-Romagna and Veneto Regions and the Province of Trento (Trentino Alto Adige Region).

➢ Functions

The Basin Authority activities are:

- preservation and recovery of drainage basins territories;
- preservation and regulation of water flows;
- extractive activities regulation;
- containment of the soil subsidence phenomenon;
- preservation of the coasts;
- reclamation of surface and groundwater;
- rationalisation of water resources;
- preservation of the public property and institution of protected areas;
- integrate management of the public sector services;
- rearrangement of the hydro-geological restraint.

➢ The Basin Plan

The main responsibility of the Po River Basin Authority is to provide drafting and implementation of the Basin Plan, covering soil defence, hydro-geological and hydraulic reorganisation, water and land employment.
The Basin Plan includes policies and measures for all the basin and it is responsible for their implementation; regional and local administrative bodies have to receipt the decided policies.

The most serious problems in the basin area are related to landslides and erosive phenomena, floods, surface and groundwater pollution and drinking water contamination.

➢ Strategic aims

The goals to be achieved by the Basin Plan are:

- the organisation and updating of data and information on the physical system and the territorial use of the basin;
- the identification and assessment of existing and potential polluting situations;
- the definition of objectives to be pursued and the strategies to be adopted;
- the choice of directives to be followed for soil defence, hydro-geological and hydraulic reorganisation;

- the programmed water employment taking into account agrarian, forestry and extractive resources;
- rules and measures to regulate the quarrying activities;
- identification of areas to be subjected to special restrictions;
- regulations against soil pollution;
- measures against subsidence;
- choice of priorities.

The objectives to be pursued by the Po River Basin Authority regard the organic reorganisation of the Po basin and the safeguarding of the Adriatic sea; it works for:

- the restoration of natural systems and an artificial reduction in the basin;
- monitoring systems;
- the rationalisation and optimisation of services and associated structures;
- the search for financial measures in order to realise the Basin Plan.

Specific objectives and strategies laid down for the various sectors covered by the Po River Authority are:

- action to counteract the deterioration of slopes and areas of instability, for the protection of inhabitants and infrastructures through measures giving priority to the conservation and the recovery of the natural characteristics of the environment;
- protection of the coastal areas and of the delta in general with regard to ensuring its functionality in the context of the Po basin.

- The pursue of actions regarding the safeguarding of water quality and quality levels compatible with the protection of ecosystems and utilisation:

- the attribution of priority to measures affecting sources of pollution and not merely its effects;
- the monitoring and control of water resources in relation to their use (drinking water, aquatic life and natural characteristics, irrigation, industrial exploitation, bathing, internal navigation);
- the conservation of the relevant aspects of the natural heritage with reference both to aquatic life and safeguarding of environmental assets (marshes, parks);
- minimising impact on the marine ecosystem, with special reference to the elimination of the underlying causes of euthrophic substances and toxic phenomena.

- The pursue of actions regarding the rational use of water resources, compatibility among resource exploitation, natural environment protection, efficiency and effectiveness of plant operation and maintenance, and management of the services provided:

- the optimisation of the resources management while ensuring that the total quantity drawn should not endanger the minimum acceptable flow required by the river beds;
- the attribution of priority to drinking water;
- increasing the availability of surface water for various uses;

- safeguarding the quantitative and qualitative equilibrium of the groundwater;
- planning the demand in order to ensure the future water budget.

- Policies concerning the regulation of territorial use, the goals of the environmental protection, the compatibility of human settlements and activities and the sustainability of economic and social development are to be pursued through:

- restoring state control over river areas and protection of resources of real public interest;
- regulation of quarrying activities, with specific attention to compatibility with the environmental situation of the watercourses;
- promotion of steps to upgrade the productive processes, technologies and products of industry and agriculture in order to reduce water consumption, water pollution and soil degradation.

While the approval of the plan is still pending, the Authority can make use of other instruments that are:

- the "Schema Previsionale e Programmatico", an instrument with the purpose to coordinate and plan the activities with reference to the territorial setting and defence (**art. 31 L.183/89**)
- the "Piani Stralcio", acts which regulate only the most urgent aspects of a larger matter and
  refer to single areas of the basin or to single functional sectors, (**art. 17, L.183/89**)
- the "Misure di Salvaguardia" safeguard measures which refer to mountain basins, high valley torrents and other contexts as indicated in **art.17.3**, b),c), f), l) and m) letters
  These law references remain in effect until the approval of the Basin Plan, but not over three years

Decisions belonging to the Basin Plan are supported by the "Progetto Po", which favours the creation of knowledge by providing provisional and descriptive tools. The project is divided in thematic areas:

- water resources rationalisation area
- hydro-geological area
- area for the safeguard of the water quality
- area for a rational employment of the soil especially referring to the agricultural activities
- monitoring and control area, for the development of all the tools needed by the Authority for the progress of the planned activities
- area for the inter-project coordination, with reference to the connection tools between the Plan and the Po project

The elaboration of the Plan is based on a specific Information System.
This is articulated into three phases:

1) information gathering about the basin situation as it was established by the L. 183/1989 and specified by the coordination act of the **D.P.R.** (Presidential Decree) **7 January 1992** and **D.P.R. 18 July 1995**

2) elaboration of "Piani Stralcio" with reference to the basin sub-areas
3) management of the "Piani Stralcio"

The goal of "Piano Stralcio" is to give an effective management tool to reduce specific environmental problems in limited basin areas. In particular, the "Piano Stralcio per il Controllo dell'Eutrofizzazione" (eutrophication problem), the PS45 (for hydro geological risk) and the "Piano stralcio delle Fasce Fluviali" (for a suitable use of fluvial resources).

Italian Policy framework

In Italy, the environmental policy approach has traditionally been dominated by response to crisis or emergency, leading to a flurry of hasty legislation via decrees (Pridham *et Al.*, 1997). As a result, in the last decades, Italian environmental legislation has become quite extensive and very sectorial, but often difficult to apply in practise.

In order to describe the policy framework in the context of EUROCAT Project, the legislative structure and regulations concerning the environmental protection at catchment scale and at coastal zone level have been analysed. A detailed description is reported in the PoCat – Legislative Report (D. 1.3).

The first organic legislation on environmental protection from water pollution was the so-called "Legge Merli" (Law 319/76) that introduced pollutant discharge regulation and identification of pollutants concentrations limits in water.

In May 1989, the Italian Parliament approved a law (183/89) introducing a substantial change in the approach to soil protection and water management. The law established the *hydrographic basin* as the environmental reference system within which all regulatory actions – i.e. soil protection, water pollution abatement, water resources management - had to be coordinated by different institutional bodies with the objectives of sustainable economic and social development and the protection of the environment.

Italian territory was therefore divided up into basins, classified as being of national, interregional and regional importance. For the nationally significant basins the law set up Basin Authorities to oversee the different sectoral policies for the water cycle. It is within this context that the Po Basin Authority was established. Since then, the Authority has played a relevant role in the study, management and planning of the Po river catchment. Among its many duties, the Authority has produced a Po Basin Plan, covering soil defence, hydrogeological and hydraulic reorganisation, water and land utilisation (L.183/89 art.17, comma 1), and the strategic Plan 'Piano Stralcio per il controllo dell'Eutrofizzazione' adopted 31 January 2001 in order to contain and reduce the eutrophication phenomenon.

As regards action directed specifically towards the problem of eutrophication in the Adriatic Sea, a Joint Commission was established in 1974 with the aim of safeguarding the Adriatic sea and the coastal zone from pollution. The Commission launched in 1977 the Adriatic Scientific Co-operative Program (ASCOP) with the aim to develop an oceanographic research campaign.

Unfortunately, the programme faced many bureaucratic and financial problems, and failed in the end to provide an effective action plan for pollution abatement.

The D.P.R. 470/1982, receipting the EU-Directive 76/160/CEE, recognised the necessity to control water quality in coastal zones with a Monitoring Program under responsibility of Sanità Ministry. In 1990, the first National Program for the Adriatic Sea to control the eutrophication phenomenon was enacted, and in 1997 this programme was extended to all Italian regions. This program is controlled from the Environmental Ministry and the Central Inspectorate for the Sea Defence. The collected dataset is stored into the SI.DI.MAR database. For more details see the PoCat – Legislative Report (D1.3).

In order to contain the eutrophication problem, extensive legislative activity at the national scale was initiated. Starting from the D.L. 667/1985 concerning urgent measures to contain eutrophication phenomenon and D.L. 227/1989 concerning measures for eutrophication reduction it was approved at national scale the 283 Ordinary Law in 1989 that receipts the D.L. 227/1989.

At the national level, a Committee (Law 283/89) followed by an Authority of the Adriatic basin (Law 57/90) were established to co-ordinate emergency interventions and research activities in the Adriatic Sea. They were also to adopt the Master Plan for the basin and give directives to other public bodies. However, due to the presence of internal conflicts and the failure to reach any form of agreement on problems related to the Adriatic, the Authority was abolished in 1994.

Many national and European directives have been designated with the aim of lowering nutrient levels, by focussing on their sources in the upstream basin (e.g. improved wastewater treatments, limitation in fertiliser use, and reduction of livestock numbers). Nitrate Directive 91/676/EEC,(152) (D.M. 14/9/1999 approvazione del codice di buona pratica agricola). Modifica alla DEC LEG NAZ 152 è la 258/2000.

At a national scale, **Law 152/99 (N.D. 91/676/CEE, Urban wastewater 91/271/CEE)** defines the general guidelines for water protection from pollution. The legislation defines the quality objectives for the different types of watercourses which are planned to reach a sufficient standard within 2008, and a good one in 2016. The law comprises also the formulation of management plans by the Regions by December 2003.

The first step in these plans is the elaboration of monitoring programmes to identify both natural and socio-economic resources in each basin, as well as the main management issues related to human impacts and other natural pressures.

In this monitoring phase, the **National Agency for Environmental Protection (ANPA)** has the responsibility to plan and coordinate the monitoring program and establish critical loads and water quality standards. All data will then be available in the National Environmental Information System (SINA).

A monitoring system has been organised at a regional scale in order to classify the biological, chemical, physical and microbiological quality of inland and coastal waters.

The Ministry of the Environment with its **Central Ispectorate of Sea Water Protection (ICDM)** is already active in coastal water monitoring and has already organised an information system (SIDIMAR), now directly connected with SINA.

The most recent **European Water Framework Directive 2000/60/EC** establishes the obligation for Member States to promote a list of initiatives aimed to the protection of inland surface waters as well as coastal waters and groundwater in order to prevent and reduce pollution, promote sustainable water use, and protect the aquatic environment.

2.5.REBCAT

The issue of controlling nitrates and phosphates calls for an understanding of the complete institutional framework in relation to rivers, seas and land based pollution. A legislative framework embracing the most relevant laws, treaties and regulations for the REBCAT case study is presented in the contribution to D1.3 by Gupta et al. 2002. This report does not present a detailed analysis of the laws and regulations, but instead presents an inventory of the policy; and makes a first level analysis of the information available. Information on legislative issues is also included in the coastal zone description for the Elbe case study (Kannen et al., 2002 a)

Laws, policies and jurisdictions are the result of historical and geographical factors. When one examines a simple problem such as the transport of nutrients through rivers via several countries to the ocean, this is immediately a very complex problem from a management perspective because the problem keeps crossing jurisdictions, not just at an international level, but also at a national and a local level. There are overlapping jurisdictions but these are not necessarily closely linked, or coordinated. A variety of different organisations are working on similar issues within the field of river basin pollution and international water pollution. However, it seems that there is little comprehensive attention paid to how the issue is covered by the different organisations, and through the different laws and policies. Instead, it seems as if organisations approach aspects of the issue in a piecemeal fashion, in response to events, or situations, and from this, new laws and policies are eventually developed, in a similarly piecemeal fashion. The European Water Framework Directive possibly offers a potential solution to such a problem, although it too has its limitations.

The interviews carried out for the Elbe catchment have indicated that the present legislative framework, and especially the WFD, has good potential. The WFD adopts an holistic approach to the management of waters, where the resources are linked to uses, terrestrial environment, aquatic environment and finally to development and human health. According to the Water Framework Directive, Member States have not only to prevent the deterioration of the status of all bodies of surface water, but also to protect, enhance and restore all bodies of surface water, except for artificial and heavily modified water bodies. The WFD defines five classes of ecological status: 'bad', 'insufficient', 'moderate', 'good' and 'high', the goal is to reach good surface water status by the end of 2015.

It has been however highlighted that lacking clear definitions might hinder the implementation of the legislative framework. Moreover the interviewees stressed that

the various conventions and institutions dealing with environmental issues still lack cooperation, harmonisation (including that of timetable implementation) and synergetic action. For instance the approaches of the WFD and the OSPAR Strategy to Combat Eutrophication are similar, but the former aims to achieve 'good ecological status' by 2015 for river basin districts, while OSPAR's target is 'no occurrence of eutrophication in marine waters' by 2010.

International issues: the IKSE

For international cooperation in the Elbe catchment the most significant structure is the International Commission for the Protection of the Elbe (IKSE/MKOL), founded in 1990 with an agreement between Germany, the Czech Republic and the European Commission. The commission has been successful in coordinating international action, for instance in promoting and facilitating the spatial division of costs and benefits for the construction and improvement of waste water treatment plants in the Czech Republic. In this case the city of Hamburg, also obtained large benefits from this initiative, which significantly contributed to its abatement costs. The IKSE facilitates not only the cooperation between the Czech Republic and Germany, but interacts also with NGOs (e.g. WWF) in regular assemblies (once a year). During the past years the IKSE has concentrated its action on WWT improvement. At present WWT in the whole catchment has reached such a good level that further technical improvement would not be cost effective, although in the Czech Republic improving connections to WWT still is a relevant issue. This strong reduction of point source emissions resulted in a relative increase of diffuse source emissions of Nitrogen and Phosphorus, for Nitrogen in the period 1993-1997, depending on the region between 60 and 75% of the total emissions were represented by diffuse sources (Arge-Elbe, 2001). Moreover the WFD implies new activities for the Commission: in the past the IKSE focused on the quality of the Elbe river water and the related floodplains, although having among its main objectives the reduction of pollution flowing to the North Sea.

The WFD promotes the concept of Integrated River Basin Management, explicitly addressing spatial relations between different land use functions within one functional spatial unit. The goal, "good ecological quality", also requires coordination of IRBM and ICZM, i.e. integrating activities of the IKSE and those of organisations and institutions focusing on the coastal area. In the future, all effluents and the whole catchment area will have to be part of the IKSE study area.

2.6. VISCAT

Regulations at sea

All the Baltic Sea States have a territorial sea the breadth of which is up to 12 nautical miles measured from the baseline, in most cases the low-water line along the coast. Baltic Sea States have established an exclusive economic zone (EEZ), the breadth of which is up to 200 nautical miles measured from the baselines from which the breadth of the territorial sea is measured.

The Act of March 16th 1995 on Prevention of Pollution of the Sea from Ships concerns:

- All vessels present in Polish marine areas (internal waters, territorial sea and exclusive economic zone),
- Vessels flying Polish flag outside Polish marine areas.

Helsinki convention: Implementation by the Baltic Sea States

The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), and the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974/1992 (the Helsinki Convention) form the basis for the marine environmental legislation in the Baltic Sea Area, to be implemented through national legislation. (The 1992 Helsinki Convention entered into force on 17 January 2000, from which date the 1974 Helsinki Convention ceased to apply).

The acts, codes etc. of the Baltic Sea States ensuring national implementation of the regulations of MARPOL 73/78 and the Helsinki Convention are listed below. More detailed information on some of these acts can be found in the "Reference list of national acts and regulations".

In Poland, responsibility for violation of laws and regulations on protection of marine environment is provided in:
1) the Act of March 21, 1991 On Marine Areas of the Republic of Poland and On Maritime Administration,
2) the Act of March 16th 1995 on Prevention of Pollution of the Sea from Ships.

The Act of March 21, 1991 on Marine Areas considers wilful pollution of the sea by a foreign vessel as a violation of the right of innocent passage through the Polish territorial sea (like the UNCLOS).
The Act of March 16th 1995 on Prevention of Pollution of the Sea from Ships regulates in detail the control measures, inquiries and responsibility for polluting marine environment. This Act enforces:
1) International Convention for the Prevention of Pollution from Ships, MARPOL 73/78,
2) Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974,
3) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, 1972.

➢ Practices of the Baltic Sea States in enforcing anti-pollution regulations

The Baltic Sea States have decided on a harmonised interpretation and thereby implementation of the anti-pollution regulations by establishing criteria for determining the severity of a violation and the minimum level of the fine to be imposed (cf. HELCOM Recommendation 19/14 "A Harmonized System of Fines in Case a Ship Violates Anti-pollution Regulations". In accordance herewith violations of the duty to keep the Oil and Cargo Record Books are regarded as a continuing offence. This means that even if the duty to make entries in the appropriate record book arose on the high seas, it can be enforced in a port of a Baltic Sea State.

Furthermore, amongst other things, a minimum level of fine has been recommended in case of missing entries in the Oil Record Book on the quantity of sludge.
No specific information from Poland is available today.

- Investigation and Prosecution

Investigations of (suspected) different authorities in the Baltic Sea States carry out violations of anti-pollution regulations. Some States have charged specific Boards with this task. Common for most of the States is the co-operation between a multitude of authorities.

Violations of anti-pollution regulations fall under two different categories; administrative offences, and/or criminal offences (based on civil or penal law). Apart from Finland and Denmark competent authorities in the Baltic Sea States can impose administrative fines for specified violations of anti-pollution regulations. In case of court proceedings the venue is decided, *inter alia*, on the basis of the place of the offence, place of residence of the defendant or the suspect. In addition, Finland and Germany have centralised the competence at specific courts in case of (suspected) violations outside the territorial seas. Various authorities can impose an administrative fine.

Poland - Detection of pollution of marine environment caused by activities on the sea, and of offenders, is performed by the Maritime Inspection, which co-operates with the Border Guard, using its means and resources. If an inspector of the Maritime Inspection is not present on board the vessel of the Border Guard, the Guard can by itself perform activities in the name of the local maritime authority.

The Act of March 16th 1995 provides that the Director of the Maritime Board may:
1) with respect to a vessel flying a flag of a State which is a Party to the MARPOL 1973 /78 Convention:
a) in port or offshore terminal, perform inspection of the vessel (limited to checking certificates and other documents required by the Convention) and inspect oil and cargo records in order to determine whether harmful substances have been discharged from the vessel against provisions of the Convention;
b) refuse a foreign vessel permission to enter port or offshore terminal, or start procedures to ensure that navigation by this vessel will not constitute danger to the marine environment - if the vessel does not comply with the requirements of the Convention;
c) refuse a vessel permission to leave port until it is brought to proper technical state, if there are grounds to suspect that the state of the vessel or its equipment differs significantly from the one stated in certificates, or if the vessel does not have valid certificates; however, the Director of the Maritime Board may permit the vessel to leave port in order to go to the nearest repair shipyard.

With respect to vessels flying a foreign State flag which is not a Party to the MARPOL 73/78 Convention, the Director of the Maritime Board may:
a) inspect the vessel in order to ascertain that the state of the vessel fulfils MARPOL 73/78 requirements; if it is found that these requirements are not fulfilled, and that navigation by that vessel may constitute significant danger to the marine environment, the Director may refuse permission to enter port or offshore terminal;

b) if the inspection is performed in port or offshore terminal, the Director of the Maritime Board may order that appropriate repairs are made or that the vessel must leave the port or offshore terminal.

Apart from the above, the Director of the Maritime Board may:
1) enquire, from a vessel sailing through Polish marine areas, information concerning identification, port of registering, last and next port of call, and any other necessary information if there is a reasonable suspicion that while passing through these areas the vessel has violated regulations of the Act, causing pollution or a danger of pollution,
2) perform inspection of a vessel passing through Polish marine areas in the case when:
a) there is reasonable suspicion that the vessel has violated regulations of the Act by discharges which result or may result in significant pollution of the sea;
b) required information has been refused, or if the information obtained from the vessel is evidently different from the actual state, and circumstances justify such an inspection.

If information is obtained about pollution of the sea by vessels and/or dumping of sewage or other noxious substances from vessels, the Director of the Maritime Board should immediately undertake activities in order to find the offender and to collect evidence.

The Director of the Maritime Board shall start investigations:
1) with respect to a vessel flying Polish flag:
a) which caused pollution or danger of pollution of the marine environment;
b) on application of an authority of any State, if there is a suspicion that regulations of the Act of March 16th 1995 have been violated, and if evidence has been collected,
2) with respect to a foreign vessel staying in a Polish port or offshore terminal, which caused pollution or danger of pollution of marine environment in the Polish marine area.

The Director of the Maritime Board is also obliged to carry out an investigation concerning a foreign vessel, staying in a Polish port or offshore terminal, on request of:
1) an authority of any State, if it is suspected that the vessel has made a discharge outside the Polish marine area, if the discharge has caused pollution or danger of pollution in the internal waters, territorial sea or exclusive economical zone of the State,
2) an authority of a State which is a Party of the MARPOL 1973/78 convention, concerning such a discharge irrespective of location of the discharge.

The Director of the Maritime Board may start an investigation, if evidence is collected, concerning a foreign vessel which:
1) is staying in a Polish port or offshore terminal, if it has caused pollution or danger of pollution outside the Polish marine area, violating international law, regulations or standards,
2) while sailing in Polish territorial sea caused pollution or danger of pollution of this area,

3) while sailing in the Polish exclusive economical zone or territorial sea, through pollution in the exclusive economical zone has caused serious damage or danger of serious damage to the coast or to other significant interests of the State.

The Director of the Maritime Board notifies immediately the proper authority of the State of ship's flag, and of any other concerned State, about the actions and measures undertaken in accordance with the Act of March 16th 1995, and conveys to them relevant documents concerning these actions and measures.

During the proceedings, the Director of the Maritime Board:
1) admits evidence submitted by authorities of another State,
2) facilitates participation in the proceedings of representatives of competent international organisation, State of flag of the vessel, and of any other State afflicted by sea pollution incident.

Within the scope of the Act of March l6th 1995, the Director of the Maritime Board is responsible in matters of international legal assistance.

The Director of the Maritime Board imposes fines. Appeal against the decision on a fine may be made to the Minister of Transport and Maritime Economy. As a decision on fine is an administrative decision, the Supreme Administrative Court is competent for overview on legality of the decision.

➢ Required evidence

There are no formal requirements in the legislation of the Baltic Sea States requiring specific evidence to be submitted to convict an offender who has violated anti-pollution regulations. Nor are there any formal rules on how to evaluate collected evidence.
Poland - All kind of evidence are admitted. There are no special rules concerning the evaluation of evidence.

Who can be held liable?
Poland - The Act on the Prevention of Pollution of the Sea from Ships, 1995, puts on the ship's master the responsibility to ascertain and ensure that:
1) the vessel at commencement of a voyage and during it, or during any other marine activity, complies with requirements concerning prevention of pollution of the sea, confirmed by relevant certificates, and that the vessel has a contingency plan to protect against pollution of the sea,
2) required oil and cargo records are kept up to date,
3) the crew is properly trained in activities to prevent pollution of the sea.

The Gdansk Convention

In 1973, the Gdansk Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts was signed in order to solve the most urgent problem of co-operation in the field of sustainable use of natural marine recourses. The Gdansk Convention entered into force the following year (28th July 1974), establishing the International Baltic Sea Fisheries Commission (IBSFC). There are six parties to the Convention, including EU on behalf of the three Nordic countries; Denmark, Finland and Sweden.

The Gdansk Convention addressed problems associated with the fishing industry. This Convention was a step towards close co-operation in order to "maintain the maximum stable productivity of the living resources of the region" and to provide general guidelines for co-operation on fishing. The duties of the Commission are to co-ordinate fisheries management in the Baltic Sea, and to prepare and submit recommendations regarding technical measures, size limits, closed seasons and areas, and measures establishing TAC (including areas under the fisheries jurisdiction of Contracting States) or fishing effort, based as far as practicable on results of scientific research. The IBSFC is also the lead party on the fisheries related issues in developing an Agenda 21 for the Baltic Sea.

Other International Conventions and Agreements

International co-operation for the Baltic Sea is not only limited to the Helsinki and the Gdansk Conventions. There are also other important conventions and treaties, which can be a good basis for biopolitical principles:

- convention on long-range transboundary air pollution
- convention on the control of transboundary movements of hazardous wastes and their disposal
- convention on biological diversity
- convention on wetlands of international importance
- convention on environmental impact assessment in a transboundary context, especially regarding waterfowl habitats

There are also other forms of association in the Baltic Sea Region, such as meetings of foreign ministers, The Council of the Baltic States, meetings of national and regional ministers of spatial planning, "Vision and Strategies around the Baltic Sea 2010," Parliamentary Meetings for the Clean Baltic Sea and cross-border co-operation.

The International Baltic Sea Fishery Commission was established pursuant to Article V of the Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts (the Gdansk Convention) which was signed on the 13th September 1973.

On signing this Convention, the Contracting Parties recognised that they shared responsibility both for protecting the living marine resources of the Baltic Sea and for making rational use of such resources. The Convention area includes all waters from the baselines; the IBSFC is therefore not competent for the management of inland water resources.

It can be seen just how innovative this Convention was by remembering that it was actually signed before the start of the Third UN Conference on the Law of the Sea. The novel idea of an "Exclusive Economic Zone" had just been launched the same year, 1973, by a Declaration of the Organisation of African States.

The pattern of membership of the Commission changed following the accession of the European Economic Community to the Convention on the 18th March 1984, with the simultaneous withdrawal of Denmark and the Federal Republic of Germany. The

unification of Germany in 1990 reduced the number of Contracting Parties to five. In 1992, the Republic of Estonia, the Republic of Latvia and the Republic of Lithuania acceded to the Convention. Finland and Sweden became members of the European Community on the 1st of January 1995 and consequently withdraw from the Convention. Today, there are six Contracting Parties: Estonia, the European Community, Latvia, Lithuania, Poland and the Russian Federation.

The IBSFC competence is defined as follows in Article 1 of the Convention: "The Contracting States shall co-operate closely with a view to preserving and increasing the living resources of the Baltic Sea and the Belts and obtaining the optimum yield, and, in particular to expanding and co-ordinating studies towards these ends,..."

The duty of the Commission is furthermore specified in Article IX: "to co-ordinate the management of the living resources in the Convention area by collecting, aggregating, analysing and disseminating statistical data, for example concerning catch, fishing effort, and other information."

3. Stakeholder analysis

3.1. AXCAT

It is rather difficult to analyse completely the relevant stakeholder groups of Axios catchment-coastal zone, mainly because the dynamics of the river flow affects to a great extent the activities in the coast, so that many occasional human activities become intense or stop, according to the river flow, as for instance, sand extraction. Additionally, as it is the case generally in Greece, farmers to a great extent are engaged in more that one professional activity. For instance, many rice farmers (practicing intensive agriculture) are also engaged in aquaculture (mussel farming). These two stakeholder groups are reliant on good quality in freshwater and their interests have been damaged several times in the past.

Behavioural decision research (BDR) and decision analysis (DA) give a basic structure for research into how prescriptive techniques can be used to improve the quality of group decision process. Recent research (Gregory 2000, Hammond et al 1999, O' Riordan 2001, Kontogianni et al 2001) indicates that stakeholder values are the key to a structured decision approach to public involvement.

Stakeholder values identify what matter to participants and in turn highlight the consequences that require most careful attention and the tradeoffs that matter most (Gregory 2000). According to Hammond et al (1999) meaningful involvement in the decision making process requires not only an invitation to participate but also a forum for careful deliberation and a mechanism for incorporating the results of technical analysis. Focusing on stakeholder values early in the Eurocat -Axios project, two major stakeholder groups were identified and selected: a. community residents, ß. state and local resource managers/technical experts. The focus group technique for eliciting preferences and trace conflicts between community residents was applied to three professional groups: farmers, fishermen / mussel- producers and industrial producers. To interpret the focus groups results, the content analysis methodology was employed. The second stakeholder level (local and state resource managers) was

approached in two different ways: a pre-constructed questionnaire was dispatched to representatives of state agencies followed by a first round of discussions, while focus group technique was engaged for local resource managers. Useful input was received from all stakeholder groups approached for public involvement. The values elicited from stakeholders will be fed into the multicriteria analysis in a later stage. The scenarios (at this stage of research) are depicted only qualitatively, constructed on the basis of quantitative/ qualitative information coming from technical data and stakeholder analysis. It is expected that within next phase of research, stakeholders will be invited to enter the consultation process by interpreting factual scenarios. As Gregory (2000) states: '...disagreements in the expressed values of participants or differences in their interpretation of factual evidence are welcomed and examined in the context of what they can show decision makers about the links from stakeholders' support of, or opposition to, specific options to their underlying preferences'. In this respect, the synthesis of the Policy Advisory Board and its role in getting/providing the data and in shaping the future socio-economic and environmental trends are at the core of the scenario building elaborated and refined within EUROCAT.

3.2. HUMCAT

3.2.1 Stakeholder objectives and existing networks

The Environment Agency has the main responsibility for long-term water resources planning in England and Wales, and as such is responsible for water quality in the Humber. In 1992, the Department of Environment published guidance on coastal planning (Planning Policy Guidance Note 20), advocating the creation of Estuary Management Plans, with the objective of bringing together decision-makers and stakeholders to adopt a strategic approach to estuary management. A management structure was set up during 1993 and 1994, comprising of a project officer, an executive steering group to guide the project, and a working group with which the Project Officer maintained regular contact, the latter two groups representing a range of interests. Extensive consultation and a close cooperation with the Environment Agency lead to the publication of a Humber Management Strategy, summarising the objectives for the long term management of the Humber, with the aim of guiding future activities through a voluntary framework of planning and management options, as a complement to statutory processes and legislative framework. Table 6 summarises the objectives from different stakeholders, as reported in the Humber Management Strategy (HEMS, 1997).

Objectives listed in Table 6 suggest that there might be potential conflicts between types of interests. However, the way the objectives are formulated, it is also clear that some consensus has already been reached, and that there is common ground between the various interest groups.

Given the amount of consultation already done, the HUMCAT team chose to use this existing consultation exercise and adopt its findings, rather than start a whole new consultation process on general issues related to the Humber Estuary. Stakeholder consultation was however carried out on a regular basis through setting up a Policy Advisory Board, comprising key stakeholders: the Environment Agency, British Associated Ports, and the Royal Society for the Protection of Birds. Two years into the project, the group has now met six times, providing regular feedback on different

stages of project development. Fuller consultation has also already taken place through the pre-existing Humber Shoreline Management Plan steering group, originally set up to maximise input from stakeholders into the Humber Strategy, and representing the main interests around the estuary (Table 7).

A EUROCAT presentation was given in one of the HSMP steering group meetings to inform members about the objectives of the project. A further workshop was organised for HSMP steering group members and additional stakeholders representing catchment interests, with invitations being issued by the Environment Agency. The objective of the workshop was to discuss potential policies likely to be adopted in each of the 3 HUMCAT scenarios, and what main areas of interests should be taken into account for decision making. The output of the workshop is detailed in the workshop report in annex A.

3.2.2 Authorities responsible for Coastal Zone Management

Flood and Coastal Management in England and Wales falls under the responsibility of many agencies and organisations: individual landowners, Internal Drainage Boards, Local and Regional Flood Defence Committees, the Environment Agency (EA), and DEFRA. O'Riordan (2002) and Saunders (2002) describe the current arrangements for managing flood and coastal defence. For coastal defence, the primary responsibility rests with district councils, which under the Coast Protection Act 1949 hold statutory powers. DEFRA (Department for Environment, Food and Rural Affairs) provides strategic and policy guidance. It offers support and advice to operating authorities through a network of regional engineers, a national research and development programme, and funding for capital studies and works. The Environment Agency has discretionary powers under the Land Drainage Act 1991, and the Water Resources Act 1991. Saunders (2002) underlines that all these bodies, frequently referred to as coastal defence operating authorities, hold permissive powers only and are under no duty to provide these services at any level.

The Environment Agency is the executive agency, operating its flood defence powers through membership of Regional and Local Flood Defence Committees. These committees are controlled by county and district councils, and can carry out works for defence, maintenance and longer term protection, subject to approval from DEFRA and various statutory and non-statutory consultative procedures.

Internal Drainage Boards exist in flood prone areas of England, and have powers to raise revenue to fund flood defence works, again subject to approval from DEFRA and various consultative procedures.

The current vehicle for coastal planning, the Shoreline Management Plans (SMPs), were based on coastal units defined in terms of sedimentary and coastal processes, rather than administrative boundaries, making it necessary for these different operating authorities to work jointly, as voluntary coastal groups.

Table 6: Stakeholder objectives

(Source, HEMS, 1997).

Type of interest	Objectives
Agriculture	• To foster viable and sustainable farm development to support rural communities
Archeology and Cultural Resources	• To conserve and enhance the estuary's archaeological and cultural heritage, to ensure the maintenance of its special and diverse qualities and to secure its sensitive management and promotion
Fisheries	• To support and promote sustainable exploitation of the fisheries of the Humber through appropriate regulation to protect estuarine habitats and a healthy food chain whilst recognising the value of the fisheries to local communities.
Flood defence and coastal processes	• To provide environmentally, technically and economically acceptable flood defences, developed through a strategic understanding of physical processes and interests on and adjacent to the Humber Estuary • To produce a "state of the art" estuary Shoreline Management Plan" (ESMP) based on the current understanding of coastal processes, to a format compatible with the open coast Shoreline Management Plans (SMPs) to set a framework for the physical management of the estuary. • To develop an approach that would facilitate the construction of short term defence in a manner which meets the requirements of the Habitats Directive • To ensure that the planning and implementation of flood defence strategies contribute to the sustainable development of the Humber Estuary and the delivery of biodiversity at a national level.
Industry and Commerce	• To create through a partnership a dynamic, diverse and environmentally sustainable economy that provides good quality employment opportunities for local people
Integrated Pollution Control (IPC)	• To promote sustainable environmental management by working with developers, industrialists, farmers and the community in general, so as to ensure that natural resources are protected. • To improve land, water and air quality in the HEMS area without imposing disproportionate costs on industry or society as a whole.
Landscape	• To ensure that the special and distinctive qualities of the Humber landscape are protected and promoted, enhanced where appropriate and, where necessary, restored.
Nature Conservation	• To maintain and enhance the diversity and abundance of wildlife within the Estuary, especially the internationally important populations of birds.
Navigation and Port Development	• To ensure the continued growth and vitality of the Humber's Ports and Wharves and their related developments.
Sport, Recreation and Access	• To maintain, and improve the provision and availability of as wide a range of sport and recreational facilities as are compatible with the local environment of the Humber Estuary.
Tourism	• To maintain, develop and promote tourism on the Estuary in a way which ensures that all development achieves a suitable log term balance between needs of visitors, local communities, and the environment.

Table 7: Composition of HEMS Steering Group

Source: (HEMS, 1997)

Name of organisation	Interest
Associated British Ports (ABP)	Port and transport operations and property activities in the UK
British Aerospace Defence Plc	Military aircraft company – largest employer in HEMS area
British Association for Shooting and Conservation	Representative organisation for sporting shooting in Britain.
Country Landowners Association	Representing the interests of landowners and farmers
East Lindsey District Council	The council provides community services which include planning, environmental and technical services, economic development, etc.
East Riding of Yorkshire Council	The Council works to improve the quality of life for the communities of the East Riding, by providing high quality services which reflect their needs.
English Nature – Humber to Pennines Team	The Government's statutory adviser on nature conservation issues in England. It has responsibility for the designation and management of National Nature Reserves, designating Sites of special scientific Interest, and liaison with landowners and managers of those sites.
English Sports Council	National Sports development agency advising Government, Local Authorities and governing bodies of sport on the provision of improved opportunities to participate in sports and raising standards of performance.
Environment Agency	The EA is a non-departmental public body established under the Environment Act (1995). Its remit is to protect and enhance the environment, as to make appropriate contributions towards achieving sustainable development.
Humber Chamber of Commerce and Industry	Represents its members individually and collectively on key economic issues. Provides independent, customer focused support for business development and networking opportunities.
Humber Forum Ltd	To act as a consultative and advisory forum to Local Authorities on strategic planning, transportation and economic development issues.
Kingston upon Hull City Council	Local Authority, responsible for providing services to the local community.
Lincolnshire County Council	County Council responsible for providing services to the local community.
National Farmers Union	Representing farmers and growers and providing legal advice to members affecting their agricultural and horticultural businesses
North East Lincolnshire Council	Unitary Authority carrying out the whole range of Local Authority Functions
North Eastern Sea Fisheries Committee	
North Lincolnshire Council, Directorate of development and Environment	Unitary Authority carrying out the whole range of Local Authority Functions
Novartis Grimsby	Part of Novartis, the world's leading life sciences company. Manufacturer of fine organic chemicals.
Royal Society for the Protection of Birds (RSPB)	Biggest wildlife conservation charity in Europe. Takes action for wild birds and the environment.

Whenever a scheme or programme is proposed, there is a process of further engagement with statutory consultees (English Nature…) but wider consultation is now becoming the norm in response to socio-political trends of the last decades (open

government, and the explicit requirements within EU legislation like the WFD and the Strategic Environmental Assessment Directive).

The existing institutional arrangements and 'power' structures are therefore complex.

3.2.3 Funding structure

Funding for flood and coastal defence come from five sources (O'Riordan, 2002).

- The Revenue Support Grant, issued to local governments via Treasury, to pay levies to the Environment Agency, internal drainage boards, and the discretionary spend faced by coastal authorities for specific coastal protection works
- DEFRA supplementary credit approvals to cover non grant-aided works
- DEFRA grant to the Environment Agency, local authorities and the National Assembly of Wales for flood warning systems, hard and soft defences, and other infrastructure
- Drainage rates from landowners to drainage boards, and used to fund IDB expenditures.
- General drainage rates payable by farmers aimed at funding Environmental Agency expenditure (Anglian Region only).

The bulk of the funding comes from the DEFRA grant system, which allocates national funding to flood and sea defence projects based on a "points system". Coastal and flood defence schemes are assessed individually, and those schemes exceeding a given points threshold are provided with grant aid support. Until recently the assessment followed three main criteria: priority, urgency and economics. The scheme was designed to channel funds to meet the most critical needs, namely protecting human lives and the higher economic value areas such as urban conurbations. It was however criticised for placing natural assets behind flood defences under increasing pressure, and directing funding towards urgency at the expense of long term sustainability and overall coastal resilience (Turner et al, 1999).

The funding prioritisation system is currently undergoing review, with a proposal to adopt three new criteria: economics, people, and environment (DEFRA, 2002). Furthermore, because of the new legal obligations under the Habitats Directive, projects designed to maintain the integrity of internationally designated sites are considered outside the prioritisation system. The new system which takes the environment explicitly into account is clearly a step towards more sustainable defence practice. However, O'Riordan (2002) argues that (i) spatially and temporally dispersed costs and benefits from a comprehensive shoreline strategy cannot be readily incorporated into the project appraisal process, and (ii) current financing arrangements do not provide any basis for working with landowners who wish to adapt to residual flooding, i.e. "live with the floods".

3.3. IDRICAT

Interest groups, networking

Interests groups are distributed among following entities:

- governmental institutions
- authorities
- municipalities
- social partners: employers, employees and syndicate unions (industry and services)
- public institutions (research, health care, education, etc.)
- civil society (NGOs).

Collaborative communication among the groups however has only just started. This was demonstrated during preparation of the NDP 2001-2006 and is present now while preparation of the Single Programming Document 2004-2006 is going on. It is obvious that integration into EU acts towards national cohesion.

Total harmony among interest groups, however, has been reached only in the phase of fighting independence in 1990. But soon after immediate danger of war disappeared, differences emerged about development strategies. Integration into EU was not an issue in itself, however, evaluation of costs differ significantly among groups and parties. Nowadays, differences are disappearing, primarily based on the agreements about the National Strategy for Economic Development and Sustainable Development as orientation which both act as a "a glue" among different interest groups. Regarding sustainable development Slovenia established a Council at the Governmental level with the following characteristics:

The Slovenian Council for Sustainable Development has been founded by a Resolution of the Government of the Republic of Slovenia on the Founding of the Council as a consultative body supplying assistance to the Government of the Republic of Slovenia in the implementation of sustainable development in the country. Responsibility for sustainable development has been explicitly defined as an increasingly important strategic task of the country which must be placed within developmental orientations in all sectors and at all levels of organisation of society.

In addition to the ministers of all relevant sectors of public administration, representatives of interest groups include Members of the Council: environmental non-governmental organisations, chambers of commerce and industry, of crafts and of agriculture, science and academia, and local communities.

The tasks of the Council are:
• to adopt guidelines and recommendations for sustainable development in the Republic of Slovenia;
• to evaluate documents relating to sustainable development;
• to monitor the effectiveness of the implementation of the national environmental action programme and other line strategies in accordance with the principle of sustainable development.

Institutional power

Power regarding environmental issues is concentrated at governmental level and is distributed downwards through administration bodies. The mission and mandate of the Ministry is defined in the Environmental Protection Act from 1993, and is as follows:

The Ministry of the Environment, Spatial Planning and Energy ensures a healthy living environment for all the inhabitants of Slovenia and encourages and co-ordinates efforts towards sustainable development based, in addition to social well-being, on the wise and thrifty use of natural resources.

It attempts to increase concern of society about preserving a natural balance and biological diversity in the country in the conviction that biological diversity is an important heritage for future generations.

It directs the spatial development of our cities, towns and villages in such a way that we retain and develop the characteristics of the architectural heritage of buildings and settlements and the cultural landscape and, at the same time, enable economic, social and cultural development.

In the conviction that the future of Slovenia is in the community of European nations, it ensures all the necessary conditions for accession to the European Union on terms of equality, both in the area of infrastructural linkage and in that of environmental standards and measures.

It ensures adequate stocks of water sources, quality of water and sustainable arrangement of surface and subterranean water and the sea, since waters are one of the most important natural resources in Slovenia.

It ensures a reliable energy supply for Slovenia, always respecting the principle of sustainable development and the establishment of competition.

It ensures spatial development such that man's activities will be oriented in such a way that they will be least affected in the event of natural disasters, and also sets up mechanisms of solidarity relief at the time of natural disasters.

It ensures the inclusion of environmental costs on company and national levels in the economy.

In achieving the aims of sustainable development, it establishes co-operation with local communities on the principle of partnership and subsidiarity. It ensures flexibility in creating and implementing policies and measures of sustainable development by stimulating co-operation among individuals and groups and organisations of civil society (Partnership for the Environment – Programme of Co-operation between Non-Governmental Environmental Organisations and the Ministry of the Environment and Spatial Planning of the Republic of Slovenia, http://www.sigov.si/mop/en/index.htm). Above all, it strives to strengthen awareness of the common responsibility for the state of the environment, nature and space, of all the inhabitants of the Republic of Slovenia.

Potential/actual conflicts of interest and values within catchment

Potential conflicts among interest groups may arise if development goals will not be achieved as planned or if certain modifications are imposed without previous consultation/agreement among stakeholders (interest groups). Since NDP and Regional Development Plan for Goriška aim at solving development problems in the country, and particularly in the Goriška region (IdriCat), the following is a summary of topics which may give rise to conflict of interests. For general orientation in terms of environment a summary of SWOT analysis (strengths, weaknesses, opportunities and threats) is given in table 8.

Table 8: A summary of environmental strengths, weaknesses, opportunities and threats in Slovenia

Strengths	Opportunities	Weaknesses and threats
- Preserved environment and landscape between Alps, Central Europe and Balkans - High quality of natural elements/capital - High level of biodiversity - Attractive natural environment - Number of experts of highest level in different fields of environmental science - High consciousness and awereness of the importance of environmental quality among citizens and politicians	- Increase of investments in environmental infrastructure - High level of consistency of environmental legislation - High quality of environmental elements, for example groundwater - Local environmental action programmes - Reorganisation of environmental administration at all levels - Harminisation of regulation with the EU's - International cooperation and regionalism - Education at all levels and in different forms regarding environmental issues - Investments in environmental infrastructure and protection measures	- Relatively weak system in certain areas, like incentives for environmental protection, taxes, etc. - Strong profit/economic interests - Influence of finance on environmental priorities - Lack of comprehensive treatment of environmental issues in certain fields, like water management and watersheds - Old/poor data on environmental quality; unmanageable format of data for different users or purposes - Dispersed urbanisation – issue for effective municipal / environmental infrastructure - Weak public participation in environmental policy development and decision making - Delay in realisation of environmental policy and protection measures – implementation deficit

For the purpose to identify potential conflicts associated specifically with mercury pollution in the region a survey and interviews are performed in the framework of IdriCat. The results will be collected and analysed during year 2003. The first questionnaire applied in the survey/interviews is given in Annex B.

Status and problems of regional development

Social and economic indicators show significant disparities between the Ljubljana urban region, covering the capital of Ljubljana and its suburbs, and the rest of Slovenia. There are also high discrepancies between the Western and the Eastern part of the rest of Slovenia. The Ljubljana urban region represents only 12.6% of the territory of Slovenia with 24.6% of the total population, with average population density of 192 inhabitants per km2. More than three quarters, i.e. app. 1.5 million

people live in the rest of Slovenia, where average population density is much lower than in the Ljubljana region (85 persons per km2).

The Ljubljana urban region is the most developed part of the country and differs from the rest of Slovenia by a number of superior features. Demographic conditions are more favourable with population growth in 1981-2000 being one time faster than the national average. This was mainly due to the immigration of relatively young labour force, which also contributes to below average population ageing index. Economic potential and corporate sector's performance are higher, which is reflected in higher GDP per capita, higher productivity and profitability of the corporate sector. The Ljubljana urban region also have better infrastructure, better schooling system and more opportunities of further education, better geostrategic position and greater human capital. The population of the Ljubljana urban region is more educated than the average; the share of university graduates in the employed is bigger as well as the share of students per 1,000 inhabitants. The registered unemployment rate is 4 percentage points lower than in the rest of Slovenia. Another advantage of the Ljubljana urban region is its social capital, reflected in lively corporate activity, formal and informal networks. Moreover, the Ljubljana region has location advantages for the development of economic activities and has already achieved a higher development level.

According to social and economic indicators, the rest of Slovenia consistently records results below the national average. Here one still finds rural agricultural structures and problematic areas in municipalities which lack jobs and where the population is poorly educated. It is typical of such regions that most jobs are in industry and that their number is decreasing rapidly. These are as a rule closed areas with marked and persisting emigration and they mostly cover municipalities along the borders.

Additionally, there are considerable development disparities within the rest of Slovenia. Differences are especially high between the less developed Eastern and the more developed Western part of the Rest of Slovenia in the unemployment rate, which is 9.0% in the Western and 15.1% in the Eastern part, and in the share of population living in the areas with special development needs, which is as much as 83.1% in the Eastern part and only 17.6% in the Western part.

Regional economic structure and performance

Sectoral structure of Slovenian economy exhibits the prevalence of tertiary sector (58% of gross value added and 55% of labour force), which is followed by the secondary sector (38% and 41% respectively), whereas the primary sector account for no more than about 4%. The economies of Central Slovenia and the Littoral-Karst region are of a distinctively tertiary nature, whereas Koroška and Zasavska regions and Southeast Slovenia are explicitly industrial. A relatively high share of agricultural activities is still present in the Pomurska, Notranjsko-kraška and Lower Posavska regions and Southeast Slovenia. In Slovenia, 28 companies and 33 self-employed persons were registered per 1,000 inhabitants in 1999. The region with the highest number of registered companies per 1,000 inhabitants is Central Slovenia, followed by the Littoral-Karst region, whereas other regions lag behind considerably.

Table 9: Gross domestic product per capita

	GDP(PPP) in Million SIT				EU15 = 100			
	1995	1996	1997	1995-97	1995	1996	1997	1995-97
SLOVENIA (SCTU 0)	11276	12188	13029	12164	64	66	68	66
SCTU 3:								
Central Slovenia	14942	16096	17223	16087	85	87	89	87
Littoral-Karst	11508	12461	13420	12463	65	68	70	68
Gorenjska	10456	11261	12073	11263	59	61	63	61
Goriška	11080	12022	12873	11992	63	65	67	65
Savinjska	10696	11521	12239	11485	61	63	63	62
South-eastern Slovenia	10445	11265	12080	11263	59	61	63	61
Pomurska	8723	9484	10113	9440	50	52	52	51
Notranjsko-kraška	9501	10336	11158	10332	54	56	58	56
Podravska	9223	9997	10754	9991	52	54	56	54
Koroška	9715	10520	11322	10519	55	57	59	57
Lower Posavska	10199	11049	11274	10841	58	60	58	59
Zasavska	9504	10290	10732	10175	54	56	56	55
EU 15	17600	18400	19300	18463	100	100	100	100

Source: SORS, Eurostat, calculations IMAR

Central Slovenia is also the most outstanding region in terms of economic performance measured in percentage of EU15 GDP per capita (PPP) in 1995-97, followed by Littoral Karst with 68%, Goriška with 65%, Savinjska with 62% etc. The lowest economic performance is in Pomurska region with 51%, Podravska with 54% and Zasavska region with 55%. The difference between the highest performer Central Slovenia and the lowest performer Pomurska region is 87% compared to 51%.

Demographic conditions and labour force mobility

Over the last decade the number of inhabitants has been almost stagnating in Slovenia. The population is ageing quickly in all regions; the share of young people under 15 is decreasing and the share of those above 65 is rising. In two statistical regions at the level of SCTU-3 (the Littoral-Karst and Goriška regions) the share of the elderly exceeds the share of the young. According to the population and household census from 1991, only 870 settlements recorded above average population growth, whereas 3,900 settlements recorded a decrease. Growth in population and household activities was recorded in plain and valley areas. Ageing and stagnation of the number of inhabitants in Slovenia is (and will be) a structural disadvantage in two thirds of the Slovene territory.

Internal migration mobility in Slovenia is significantly lower than in the EU, even though it slightly increased in the second half of the 1990s after a long period of decline. This is not related only to tradition and culture, but also to the volume, structure, exploitation and accessibility of the housing stock. The privatisation of state-owned flats at the beginning of the 1990s contributed to the fact that over 90% of households now reside in flats owned by household members, their parents or relatives, whilst in the EU this share in 1995 averaged 56%. A large proportion of

flats occupied by their owners combined with a modest supply of private, social and non-profit flats limits the mobility of labour force.

Human capital

The basic economic and employment structure in Slovenia consists of 99 employment centres with over 1,000 jobs. These account for 84% of all jobs in Slovenia. The highest number of jobs is in the metropolitan area of Ljubljana, followed by Maribor with three times less jobs, and by Kranj and Celje together totalling the number of jobs equal to Maribor. Comparisons of population density and distribution of jobs reveal higher concentration of jobs than of population. The average job density in Central Slovenia is 1.4 times higher than in the Pomurje region. The number of jobs in the wider Ljubljana area exceeds the number of labour force by 19%, which causes problems in daily labour migrations.

The exploitation of human potential is unsatisfactory in all the regions. The activity rate is only around 53% of the labour force; the lowest in the Goriška and Pomurska regions and the highest in Central Slovenia.

Slovenia lags behind in the development of human capital, particularly with regard to higher education. Again, there are important differences among the regions. The regions with strong economic potential are able to attract an above average percentage of highly educated population. Zasavje region is in a particularly unfavourable position in this regard. Although it has an above national average share of students in the population between 20 and 24, it is far below this average by the population with higher education. Once the studies are completed, a lot of students do not return to their home region.

Besides the increasingly wide economic differences, regional development in Slovenia in the 1990s was affected by a growing unemployment, which was due to the loss of the markets in the former Yugoslavia and the transition process. Again, not all the regions were equally hit by this problem. Employment wise the most distressed regions are Podravska, Pomurska and Savinjska. In Podravska and Savinjska regions the urban industrial centres were the most affected by transition processes, while the problem of Pomurska region is that agriculture is still the dominant activity and that industry and the services sectors are unable to absorb the inflow of labour force from the rural area. The registered and ILO unemployment rates have decreased since 1998, but discrepancies between the statistical regions have remained the same.

The highest rate of unemployment is registered in the areas where the number of job vacancies is the lowest. This reflects low inter-regional mobility of the labour force. This points to two policy directions in this area. On one hand, to create conditions for increasing labour force mobility, but on the other hand, also to focus more on the resolution of unemployment problems within the regions themselves. There are at least two arguments in favour of the latter. First, the nature of the factors of low mobility makes them very difficulty to overcome on short and medium term. Second, promotion of inter-regional labour force mobility would even strengthen depopulation processes in some areas.

Infrastructure

Development of physical infrastructure is yet another aspect of regional differences in Slovenia. Interregional transport connections are particularly poor. The less developed and generally more peripheral regions of Slovenia mostly have a less developed road network. The construction of the East-West and North-South motorways will reinforce the Slovene road network, but only those regions that lie along the two Trans-European corridors will feel immediate positive effects. As regards telecommunications, the central and economically stronger regions are richer than those in other parts of the country.

Large water supply systems cover almost all people in urban areas, while the situation in rural areas is less favourable. Smaller water supply systems prevail and part of the population still uses its own water sources. The highest share of inhabitants covered by public water supply systems is recorded in the basin of the Sava river (83.9%), followed by the basins of the rivers Sotla, Kolpa and Drava, and lastly Mura (67%). The most problematic are local water supply systems. Most of them were built without the required technical documentation and they are not maintained at all or they are maintained unprofessionally. As a result the level of bacteria in several water samples is too high. The public sewage system is poorly developed covering less than a half of all households. The situation is the worst in the Mura basin with only 23.2% of the population covered by the sewage network and no supplying system reaches 30%.

Rural development

Rural areas cover almost three quarters of the Slovene territory. They are divided into urbanised and less urbanised rural areas. The urbanised rural areas (964 settlements or 16%) are situated in the broad town suburbs and in the vicinity of transport roads (individual central settlements with rural hinterlands). The most attractive living environments are the areas in the vicinity of towns, with great economic, cultural and spatial potential. The infrastructure in these areas is functionally at a relatively high level and is a comparable alternative to densely populated urban areas. The characteristics of the less urbanised rural areas (3,942 settlements) are the following: they are situated near the border, these are usually mountainous regions with poor accessibility, there are not many jobs there, the percentage of rural population is high, educational structure is weak and the number of daily migrants is high. In addition to forests, agriculture is an important factor in the formation of landscape in these areas. Rural areas with limited accessibility are undergoing a process of marked depopulation and de-ruralisation. Settlements and cultural landscape are intensively transforming, as a consequence of changed social conditions and socio-economic conditions in agriculture. The traditional forms of rural life are mostly disappearing, and many of their peculiarities are in the process of transformation, i.e. modernisation. The urban way of life brought about a series of changes into the appearance of an area, its organisation, utility infrastructure and environmental impacts as well as caused new conflicts that were inexistent in the traditional rural life.

Differences between the level of economic development of rural and urban areas are obvious. The available economic indicators show that economic conditions in rural areas are poor. Economic infrastructure is predominantly developed in urban areas

and their urbanised hinterlands. The areas in which the level of economic development exceeds the Slovene average are more or less situated in the central part of the country (the capital of Ljubljana and its surroundings).

The economic decline of most Slovene rural areas is linked to a high share of agricultural employment, which points to poor alternative employment options.

In the past Slovenia paid quite an attention to rural development. Already at the end of the 1980's it started implementing the programme of Integrated Rural Development and Village Renovation (IRDVR), which laid foundations for a modern approach in this area. It is based on initiatives at the local community level, aiming to exploit indigenous development potential in rural areas using the bottom-up approach. The IRDVR cycle comprises two stages: design stage and implementation stage, which are as a rule interdisciplinary. IRDVR primarily focuses on improving land structure, creating conditions for ancillary activities, generating value added to agricultural products, promoting tourism farms, developing rural infrastructure, protecting heritage and the like.

Based on experience gained with the IRDVR programme, so-called rural regional development programmes have recently been developed - Wine Routes and Heritage Trails. Such projects are financed from various national and local sources, combining public and private funds. Funds provided by the Ministry of Agriculture, Forestry and Food (MAFF) are of start-up nature, while projects are carried out on the basis of interest and the participation of public and private sectors at the local level. They are comparable to European models and processes of rural development (e.g. LEADER initiative), as they have been developed with the assistance of EU experts. Future reforms and new approaches to comprehensive rural development in Slovenia are set along these lines. They have already been or will be implemented in the framework of the accession process to the EU.

Urban areas development

Urban areas include a network of greater, mid-size and small towns with outskirts, and bigger urban settlements. Towns account for only 1.2% of all Slovene settlements. Their narrowest gravitation area is 838 outskirts settlements. They are the centres of social, cultural and economic life populated by up to 80% of the entire population of the country. By EU standards, population density is above average only on slightly less than 10% of the Slovene territory. A strong concentration of population and activities is recorded in about 200 settlements. In 1996, 45.6% of the population lived in settlements with over 3,000 inhabitants, which was 1.1% of all settlements. The other half of the population is dispersed in the outskirts of greater towns and cities as well in the countryside, where 71% of all residential buildings is located. Construction of buildings is extremely dispersed, since in 68% of the populated areas the density is 1-2 building per ha.

The urban regions of Ljubljana and Maribor record the highest concentration of jobs, various activities, services and environmental pollution. The population density is increasing mostly in plains, urban areas are expanding and mountainous areas, which are difficult to access, are being abandoned. People mainly migrate to the surroundings of big towns and cities where the prices of building land are lower than

in city centres. The result is increased population density in small settlements in the outskirts (sub-urbanisation), particularly where transport connections (roads) are good. This generates an excessive use of passenger vehicles. 12% of the population living in 48% of all settlements has no bus or train stops in their vicinity. Only 41% of the population has a bus stop in their settlement, 47% has a bus or a train stop, and a few thousands people have only a train stop. Further sub-urbanisation would result in irreparable loss of land and its lavish use as well as would cause problems and raise social costs of public utility service and energy infrastructure. Suburban areas are characterised by lower population density and strong dispersion of the population.

Recently, migrations from city centres have been noticed; old city cores are being abandoned, while trade and small business are moving into big shopping centres at the outskirts. There are several reasons for this - most often limited access (for customers and delivery), high rents for business premises, deterioration of buildings (the renovation and revitalisation of city centres is too slow or inadequate and does not satisfy the requirement of modern business activities) and often lacking financial resources for a complete renovation.

3.4. POCAT

Stakeholders have come to recognise that corporations must be accountable to all who are affected by corporate actions or who contribute to corporate success. These stakeholders include workers, customers, communities, financial investors, suppliers, and the greater society. Their concerns extend from economical wealth to the global environment and future generations.

For the PO catchment it is possible to identify the following different 'interest' groups within the catchment and outside (national and international) that are relevant to the policy issues and contexts being focussed on (Table 10).

Interest groups:	**Policy issues**	**Context**		**Existing stakeholder networks**
		Sectors	**Regional**	
The river basin authority Affected communities Government ministries and agencies; Local Government Utility companies Private sector firms Business and industry Trade Unions Research institutes; National and international NGOs	Unemployment Pollution Hydro-geological risk Economical development Safety and health protection	Agriculture, Aquaculture Agro-industry Industry Tourism Tertiary , Infrastructures and Utilities Protected areas	Mountain regions, Hills, Po plane, Delta Piemonte Lombardia Emilia Romagna V. d'Aosta, Veneto e Trentino A. A.	Labour unions Cooperatives Farmer corporations Industry associations Consumer associations international professional associations International Federation of Free Trade Unions

Table 10: Interest groups, Policy issues and context in the Po Catchment

Existing institutional arrangements and 'power' structures

The power structure is build essentially around two subjects: 1) the Basin Authority that is responsible mainly of pollution and socio-economic related issues and 2) the Magistrato alle Acque of the Ministry of Public Labours that has the responsibility of the hydro-geological management of the basin. These two subjects act as mediators between the multiplicity of the stakeholders involved and the policy levels of the central and local governments.

3.5. REBCAT

During a meeting at GKSS in June 2001, a potential list of stakeholders and bodies with administrative responsibilities was agreed on for the REBCAT case study (Hofmann, 2001 – see annex C). Lise et al (in preparation) identify the role of the policy advisory board (PAB) in the REBCAT. The PAB or stakeholder panel is designed in such a way that there are representatives from government at various levels, the private sector and non-governmental organisations. These stakeholders have been identified on the basis of whether they were likely to have interests in catchment area, the coastal area or both. Table 11 gives an overview:

Table 11: Overview of contacted organisations by IVM and IGB-GKSS.

	Catchment		**Coast**		**Catchment\Coast**	
Contacted by:	IVM	IGB-GKSS	IVM	IGB-GKSS	IVM	IGB-GKSS
Inter-governmental		IKSR IGKB IKSE-MKOL	EUCC			
National/subnational Government	UVW SBB DLG IPO	BfG MZE MŽP	DNZ RIVO		RIVM RWS	UBA BMVEL
Private (industry)	LTO	RV DBV	KIC RECRON		ANWB	
Non-government			WV SNM SNZ			

From the key questions of the first interview round we identified the contributing and affected parties and we evaluated the strengths and weaknesses of the institutional structure for water resource management in the European Union. A first impression is given of the viability of management packages to reduce the nutrient load to the North and Wadden Seas. It turns out that not all stakeholders perceive nutrients as the main pollutant in North and Wadden Seas. Agriculture, effluents of waste water treatment plants (WWTPs) and poor spatial planning are the main contributors to pollution of the sea. Stakeholders also argue in favour of the urgent development of an integrated vision including better spatial planning as a means to further improve the environmental context of the North Sea. While theoretically speaking, the establishment of wetlands have great potential for reducing nutrients in the fluvial system, stakeholders were not convinced about its practical applicability and instead

pointed out that action needs to be taken first in the agricultural sector and in the waste water treatment plants.

Although not all the interviews for the Elbe catchment have been carried out so far, one of the main results of the meeting with the "stakeholders" was that very few of them feel themselves being stakeholders. Rather they should be addressed to, as it originally was agreed on, as an "advisory board". Most of the interviewees spoke on behalf of the Government or governmental operating agencies, such as ministries. They represent rather a "policy network", having the power to influence the decision-making process to a certain degree. They might not be directly affected by the decision-making process, but inform the decision-making process and contribute to law implementation procedures, they do not see themselves as stakeholders. Indeed only very few of the selected "stakeholders" are key-stakeholders, i.e. directly affected by the decision-making process. For this reason from now on the old term of Policy Advisory Board, or shortly Advisory Board (AB), will be used for designating the Elbe "stakeholders". A major issue biasing the interview results is that the large majority of the AB members belong to Germany. During the Magdeburger Gewaesserschutzseminar the EUROCAT participants were able to get in touch with some more interviewees on behalf of the Czech Republic, although still the ratio German/Czech interviewee does not reflect the ratio German/Czech area of the catchment.

The nine interviews that were carried out gave a varied insight into policies, policy acceptance and feasibility of measures for nutrient reduction, as well as possible conflicts. The decoupling of the animal and plant production cycles is the main problem. The high residence time of nutrients (20 to 30 years) in groundwater is a specific problem in the Elbe catchment. Some groups may use this argument as an excuse for not elaborating a reduction strategy. Some of the interview partners were inadequate for discussing about the nutrient issue. This is particularly shown in the suggested measures for reduction, which can be more seen as a sort of guideline for policy, rather than concrete measures for reduction. Cooperation and voluntary agreement are, according to the interviewees, the key-words for future successful policy. A point of major concern is also the communication between policy-makers and key-stakeholders, which would allow for compromises and win-win solutions. Among the measures technical measures and re-allocation of subvention in relation to environmental friendly agriculture are indicated as the most "reasonable" measures for combating catchment driven nutrient enrichment of the coastal waters.

According to the interviewees technical feasibility, nutrient reduction specificity and political acceptance are the main criteria according to which a measure should be evaluated and chosen, while absolute costs play a secondary role, at least under a certain threshold.

Within the Elbe catchment still much has to be done for achieving cooperation and synergetic action in handling with environmental problems. The dissemination of knowledge is stagnating not only in the direction flowing from science towards policy (in which actually much has been done during the last years), but much more among different institutions, even within the same country, and between policy networks and the general or the affected public. According to the interviewees the future will be

shaped by the EU-politics and people mentality. These are also the two main drivers playing a role in the field of nutrient reduction.

4. Conclusion

Although a number of international, and in particular European legislation and policies affect all catchments, the institutional setting varies greatly across the different EUROCAT catchments, at national, regional and local levels. Along with the different interest groups and stakeholder networks, this is likely to influence scenarios and policy analysis significantly. Catchment teams have adopted different strategies for stakeholder consultations, depending on the history and intensity of past official consultations. Across the EUROCAT case studies, this is an essential part of the research, and an especially policy relevant one given the context of the Water Framework Directive which requires stakeholder inputs in defining catchment management plans.

References

Arge-Elbe, 2001: Analyse der Naehrstoffkonzentrazionen, -frachten und –eintraege im Elbeeinzugsgebiet. Bearbeitet: Dr. W.G. Pagenkopf. Aufgestellt: prof.Dr. H. Reincke.

Crooks, S., and Ledoux, L. 1999. Mitigation banking as a toll for strategic coastal zone management: a UK perspective. CSERGE Working Paper GEC 99-02.

DEFRA, 2002. Scheme Prioritisation System. Flood Management Division. March 2002 Consultation Document.

Environment Agency, 2001. Water Resources for the Future. A Strategy for North East Region.

Gregory, R. (2000), Using stakeholder values to make smarter environmental decisions. *Environment* 42, pp. 34-42

Gupta, J.,Hofmann,J., Lobsinger,A. and Nunneri,C.,2002 Report on Relevant National and International Treaties and Regulations, An Inventory of Institutions Involved in Water and Environmental Quality of the Rhine and the Elbe River, the North and Wadden Seas, D1.3 of the Eurocat project, Report W02/10, IVM, the Netherlands.

Hammond, J. S., R. K. Keeney and H. Raifa (1999), Smart choices: A practical guide to making better decisions. Boston, Mass: Harvard Business School Press

HEMS, 1997. Humber Estuary Management Strategy. March 1997.

Kaika, M. and Page, B. The making of the EU Water Framework Directive: shifting choreographies of governance and the effectiveness of environmental lobying. University of Oxford, School of Geography and the Environment. Economic Geography Research Group. WPG 02-12

Kallis, G. and Butler, D. 2001. The EU Water Framework Directive: measures and implications. *Water Policy* 3: 125-142.

Kannen A. , Windhorst, W. & Colijn, F., 2002a. The Elbe Catchment and Related Coastal Area: German Bight and Wadden Sea, Part C: Socio-economic and Institutional Profile.

Konsolas N. A. Papadaskalopoulos and I. Plaskovitis (2002), Regional Development in Greece. Berlin: Springer verlag

Kontogianni A., Skourtos M., Langford I., Bateman I., Georgiou S., (2001), Integrating Stakeholder Analysis in non- market valuation of environmental assets, *Ecological Economics* 37: 123-138

Hofmann, J., 2001. EUROCAT Workshop – Rhine/Elbe Catchment (RebCat). GKSS, Geesthacht, Germany. 21 - 22 June 2001. Internal Workshop Report.

Ledoux, L., Crooks, S., Jordan, A., Turner, R.K. 2000. Implementing EU biodiversity policy: UK experiences. *Land Use Policy* 17:257-268.

Lise, W., Gupta, J., Nunneri, and C. Hofmann, J., in preparation, Report on stakeholder interviews, IVM, the Netherlands, IGB and GKSS, Germany

O'Riordan, T. (2001), On participatory valuation in shoreline management. In: R. K. Turner, I. J. Bateman and W.N. Adger (eds), Economics of coastal and water resources: Valuing environmrntal functions. Dordrech: Kluwer Academic Publishers.

O'Riordan, T. (Ed.) 2002. Redesigning the Coast: a report of a workshop. CSERGE Working Paper PA 02-01.

Saunders, B. (2002) The Local Authority Experience, in O'Riordan, Op. Cit.

Turner, R.K., Adger, W.N., Crooks, S., Lorenzoni, I., and Ledoux, L. 1999. Sustainable coastal resources management: principles and practice. *Natural resources Forum.* 23(4): 275-286.

Annex A: Report on the EUROCAT/SMP steering group workshop,

Environment Agency, Phoenix House, Leeds

25 April 2002

1. Objectives and structure of the meeting

The purpose of this workshop was to get views from a range of stakeholders in the Humber estuary and catchment on options to improve water quality in the Humber estuary. It is part of an interdisciplinary European research project (EUROCAT), currently taking place at the University of East Anglia, that analyses the response of coastal seas to changes in the fluxes of nutrients and contaminants from river catchments. 30 participants from a variety of organisations attended the workshop (see annex 1). The day was structured in plenary brainstorming sessions and break-out in depth discussion groups, with two main themes: policy options to improve water quality in the Humber, and criteria to evaluate these policy options.

2. Introductory presentations

Tony Edwards (Humber Strategies Manager, EA) introduced the afternoon workshop and gave an update of the situation in the Humber.

The context of the EUROCAT project and ongoing scientific research was then presented. The overall aim of the project is to develop a quantifiable framework of analysis for improved planning and management of catchments, with a particular focus on water quality. There are eight EUROCAT case studies throughout Europe, the one in the UK being the Humber estuary and catchment (HUMCAT). The Humber estuary is considered as an extension of the coast, and inputs from the catchment include both riverine and direct input to the estuary. EUROCAT research requires an interface between natural science models and socio-economic tools. While scientists are looking at fluxes of nutrients and contaminants from the catchment, and their transport through the estuary, socio-economists are investigating the costs and benefits of management options, and their wider consequences for a range of stakeholders.

The objectives of the policy analysis, and of the specific aims of the workshop were then introduced. Water quality issues are important in the Humber and other regions in Europe, for a variety of reasons, hence the existing legislation on water quality. There are current water quality objectives that need to be met, which are met most of the times, but with some exceptions. In the near future, the Water Framework Directive will set objectives that might be tighter than current ones. Objectives might also change in the longer run, and a change in water quality might be desirable on other grounds than compliance with legal requirements. This research project seeks to analyse the different policy options and measures that are available to us to improve water quality in the Humber and other case studies. Options might be related to : control measures on agriculture or industry, sewage treatment, cleaning up or

removal of contaminated sediments, or managed realignment (realigning coastal defences further inland, thereby recreating intertidal habitats which can play a role in nutrient and contaminant removal). Practical measures are likely to be a combination of options. These options can be targeted at the level of the estuary or in the wider catchment. One policy question is: how effective are these measures at reaching the environmental targets, and at what cost? This is a cost-effectiveness issue: what measures or combination of measures are able to reach a certain water quality target at least cost? The Water Framework Directive requires member states to carry out this analysis in all catchments, and this is one branch of analysis within the research project. But there are wider policy issues. Each of the options available to decision-makers to improve water quality has wider impacts in a range of areas: on biodiversity, on regional economic growth, on unemployment rates, etc... Multi-criteria analysis is a tool that researchers use to analyse the wider impact of policy options, and how they are perceived by a variety of "stakeholders" or interested parties.

The workshop aims were primarily to have views from participants on what policy options could be used to improve water quality in the Humber, for the first steps of the multi-criteria analysis. The main objectives were : (i) for participants' suggestions to result in a small number of "policy packages" or combinations of policy options, which decision-makers could consider. (ii) to discuss wider potential policy impacts that participants are concerned about, and to discuss these as potential parameters, or "criteria" against which the different policy packages could be evaluated.

3. Brainstorming and break-out discussion on policy packages

The objective of this session was to think about different possible policy options to improve water quality in the Humber. These could be economic instruments, such as taxes or subsidies, legal instruments, e.g. emission standards, or other options such as managed realignment. The measures can target different sectors of the economy, and be at the level of the catchment (e.g. taxes on fertilisers) or on the estuary directly (e.g. sewage treatment for direct inputs in the estuary, or managed realignment). Participants had about 15 minutes to think about three possible measures that could be used, write each one of them on individual yellow stickers which have been distributed, and come and paste it on the flipcharts. The whole list was then copied on two other flipcharts. The participants were split into three groups and asked to organise the list of options into three coherent policy packages. To avoid being constrained by present conditions, and to make sure policy packages were as different as possible to make the analysis worthwhile, they were asked to think about three world views, or mind sets, which would result in different approaches in dealing with water quality.

- In Policy Package number one, decision makers are mostly concerned about economic growth, and not so concerned with environmental losses, which, it is assumed, can be mitigated now or in the future. The objective is to avoid further deterioration of water quality, i.e. maintain the status quo, or improve water quality slightly.
- In Policy Package number two, decision makers want to achieve some sort of sustainable development and assume that environmental protection is as important as economic growth, since the former is the foundation for the latter in the future.

Maximising economic growth is therefore not the prime goal. In practical terms, they want to meet the 50% reduction in nutrient fluxes to the North Sea, as required by current international treaties, and meet all Water Quality Standards for contaminants.

- In Policy Package number three, decision-makers are primarily concerned about the environment and its long term conservation. The objective is to get back, over time, to pre-industrialisation (considered to be "background") levels in the water for both nutrients and contaminants.

Participants were asked to discuss the combination of instruments they would use in each different context using the list of options resulting from the brainstorming session as a starting point, and including others if necessary. Each group was asked to look at one particular policy package.

For the policy package corresponding to the business as usual scenario, people suggested: no tightened trade standards or taxes in order not to limit growth; a minimal amount of sewage treatment given that current standards were felt to be already high, and no significant increase in water charges; support for cleaner technologies in order to allow economic growth with less environmental impact; subsidies for more environmentally friendly agricultural practices (e.g. organic farming); planning policies to control urban run-off; and buffer zones such as riparian zones and saltmarshes, focusing on their nutrient and contaminant removal capacity.

For policy package number 2 (policy targets), the following options were suggested: improved sewage treatment works and higher water charges; emission standards preceded by time limited incentives in order to reduce their costs on industries; promotion of good agricultural practices; strategic planning and zoning for urban drainage. Participants suggested in general the use of incentives rather than penalisation.

Finally, options considered in the deep green related policy package included: education and training to support new lifestyles and technologies; voluntary measures and market-led initiatives such as eco-labelling; improved sewage treatment works, and subsidies for buffer strips along rivers and managed realignment, taking into account their wider benefits; incentives for cleaner technologies; Sustainable Urban Drainage (SUD) wherever feasible. There was some debate around the desirability of large-scale organic farming, and participants concluded there wasn't enough knowledge about this at present to come to definitive conclusions. Participants also underlined that the contaminated sediments in the estuary were a constraint to many policy options, in particular managed realignment. New technologies might mean that cleaning up or removing these sediments might become a less costly option in the future.

Rationalising these preliminary policy packages, and making them consistent amongst each other could lead to the three policy packages described in table 1, using the same instruments to varying degrees.

The results of an ongoing cost-effectiveness analysis of policy measures might influence the composition of these packages, but they will follow broadly the categories outlined above.

Sectors	Policy package 1	Policy package 2	Policy package 3
Agriculture	Small amounts of subsidies for extensive agriculture	Subsidies for good agricultural practices	Possible large scale support for green agriculture. Higher food prices
Industry	Non-restrictive emission standards	More restrictive emission standards, preceded by incentives	Eco-labelling and fall back emission standards
Urbanisation	Planning measures	Some SUD	SUD wherever feasible
Sewage treatment	Minimal sewage treatment	Some increase in sewage treatment and water charges	Tertiary sewage treatment with high water charges
Contaminated sediments	No policy	No policy	Possible clean-up if new technologies allow it.
Wetlands	Support for limited, opportunistic wetland creation	Support for medium scale wetland creation but no overall strategy.	Support for strategic large scale wetland creation; land banking

Table 1: policy packages

4. Brainstorming and break-out discussion on evaluation criteria

A similar exercise was then carried out to discuss the evaluation criteria which should be used for the multi-criteria analysis. The policy options discussed above also have wider impacts than just improving water quality. The objective of the exercise was to explore which of these impacts were relevant to participants, and on which wider issues policies should therefore be evaluated. Costs and environmental effectiveness (measured for example in terms of concentration of nitrates in the estuary) are two obvious criteria. But policies might also have impacts, for example, on unemployment rates, or house prices, or number of bird species in the estuary. We have chosen to divide criteria into 3 broad categories: environmental (e.g. nitrate concentration in estuary waters), economic (e.g. cost to agriculture) and social (e.g. local unemployment rate). Participants were asked to think about a few criteria which were most important to them, and again to write them on the flipchart, in one of the broad categories.

Participants were split into 3 groups (environmental criteria, financial/economic criteria, and social criteria). The idea was to agree on a manageable list for each category, with an opportunity in the reporting session to comment on the categories that hadn't been examined in detail. The raw output from this session is presented in table 2.

Category	Criteria
Financial/economic	Increase in water rates / cost to water companies Level of income tax/level of benefits Cost of regulations (e.g. agriculture, lost agricultural production) Costs to agriculture (e.g. loss of land to wetlands -reduced marginal costs but same fixed costs), industry (e.g. effluent treatment)and consumers (e.g. Sustainable Urban Drainage Systems) Costs to navigation and shipping Administration costs. Costs to meet standards. Compliance costs for industry or farming (licenses). Enforcement costs for EA. Tourism revenues to local economy (habitat creation) Land prices, coastal defence costs (managed realignment) Set up and maintenance cost due to technological changes
Environmental	Impact on water quality (nutrients, contaminants) Change in sedimentation Consequences in terms of species diversity Atmospheric pollution
Social	Health and flooding risks Unemployment rate

Table 2: possible criteria for policy evaluation

5. Workshop output and next steps

The output of the workshop is what can be called the "effects table". It lists the range of policy packages that policy makers might want to evaluate, and provides the list of criteria on which they should be evaluated. Table 3 summarises what an effects table that would take into account the information gathered during the workshop could look like. The policy packages and criteria will be refined to take into account other areas of research within the project, on indicators and cost-effectiveness of policy measures. The next step is to fill this table in, which requires quantifying, or evaluating qualitatively the impact of policy packages on the range of criteria. This phase is called "scoring" and will be done partly through modelling which is going on within the research project (for example the impact on water quality, or the economic costs of policy options), and partly through consultation with experts (e.g. impact on flooding risks, impact on biodiversity). Some scores will be a quantitative figure (modelling results for water quality), or qualitative (e.g. a qualitative range from --- to +++ deriving from expert opinion for flooding risk).

The second step to be completed in the future is the evaluation process per se, and involves asking key stakeholders what weight they attribute to the criteria: do they have equal importance, is one more important than the other, by how much etc. This can be done in a variety of ways, for example pairwise ranking. This will be done at a later stage of the project, probably through short individual interviews (no more than 10mn).

The final step is to combine scoring and weights to rank policy packages, and undertake sensitivity analysis to explore how the ranking of policy packages would change if different factors varied, to take into account uncertainties about physical

impacts, economic assumptions and possible change in stakeholder preferences over time.

Finally, the results of this analysis will be discussed in a final workshop in late 2003, to discuss the answers to the following questions: what are the most cost-effective measures to improve water quality in the Humber? Should we be looking at other measures if other effects and stakeholder preferences are taken into account? Multi-criteria analysis is a relatively new evaluation method, and part of the research is to assess whether it yields useful results, in particular whether it is a useful way of integrating stakeholder's views. Feedback from participants will therefore be very welcome.

Policy Package/ Criteria	PP 1	PP 2	PP 3
Economic: Costs to : agr.; ind.; navig., flood defence Level of taxes Land, food prices Regional GDP			
Environmental Cu, Zn, N, P conc Biodiversity Habitat change Atmosph. pollution			
Social Health, flooding risks Unemployment rate Amenity value			

Table 3: The Effects table

List of participants

EUROCAT / SMP steering group workshop
25 April 2002, Environment Agency, Phoenix House, Leeds

ATTENDANCE

Name	Organisation	Interest/Comment
Peter Barham[1]	ABP, London	Environmental Manager
Heather Bingley	Lincolnshire Wildlife Trust	Conservation
Sue Boyes	University of Hull	Researcher, Geography
David Collier	NFU, York	Senior Adviser, North of England
Denice Coverdale	English Nature, York	Conservation
Helen Doe	British Asssociation for Shooting and Conservation	Wildfowling
Bruce Geldsthorpe	Grantham Blundell & Farran, Doncaster	Internal Drainage Boards
Ian Hall	ABP	Hull/Goole Port Engineer
Steve Hirst	Kingston upon Hull	Local Authority - Engineering
David Keiller	Binnie Black and Veatch	Engineering consultant
Tom Mallows	English Nature, York	Conservation
Nicola Melville	RSPB	Conservation
Sophie Moreton	Yorkshire Forward	Sustainability Team
Paul Murby	Wildlife Trusts	Conservation
Robert Patchett		Farming
John Rowley	Vice Chair, Humber Advisory Group, Grimsby	Industry
Bill Smith	Carter Jonas, York	Land Agents
Mark Tinsdale	Yorkshire Water	Water Services
Jack Turner	Lindsey Oil Refinery	Industry
Ruth Warren	English Nature, Wakefield	Conservation
David Wilson	DEFRA, Lincoln	River and Coastal Engineering
EA Staff		
Brian Barnett	Anglian Region, Manby	Marine Biology
Suzanne Davies	Midlands Region, Nottingham	Environmental Planning
Tony Edwards[1]	Inter-regional, Willerby	Humber Strategies
Chris Firth	North East Region. Leeds	Fisheries
Dave Gallagher	Anglian Region, Lincoln	Environmental Planning
David Hoskins	Midlands Region, Nottingham	Flood Defence
Jim Marshall	Anglian Region, Lincoln	Flood Defence
Linda Pope	Risk Assessment Options Appraisal Centre, Reading	Environmental Modelling
HUMCAT Research Team		
Diane Burgess	University of East Anglia	CSERGE, UEA
Rachel Cave	University of East Anglia	CSERGE, UEA
Laure Ledoux	University of East Anglia	CSERGE, UEA

Annex B: First Interview Questionnaire for Users and Managers of Soca/Isonzo Catchment

(Project IDRICAT)

Welcome to the IDRICAT Project! We are interested in your collaboration in investigating the Isonzo Catchment and the Gulf of Trieste. Your response to these questions and comments on any other aspects of this subject would be most welcome. The information that you will provide will help us to guide the project. We look forward to hearing from you.

IDRICAT is one of the six projects under EUROCAT. It has been financed by the European Union. EUROCAT deals with the interaction between catchments and coastal seas in Europe. The catchments that have been involved in this project are the Elbe, Humber, Po, Soca/Isonzo, Rhine, Vardar/Axios, Vistula, and Provadiiska. In distinction from other projects dealing with catchments and coasts in the past, EUROCAT underlines integration of political and socio - economic views, as well as collaboration between users and managers of these catchments. The project started on February 2001 and should be finished by January 2004.

The purpose of this questionnaire is to examine the understanding and relationships of users and managers of the Isonzo catchment to the following issues:

1. Changes in the quality of water and environment in the catchment and coast in the next fifteen years.
2. The costs of measures, their sources, methods of financing and reducing pollution with mercury.
3. Who will contribute and in what way to the improvement of the situation in the environment (economic and environmental policy).

For further information on project EUROCAT visit this website:

http://www.iia-cnr.unical.it/EUROCAT/project.htm

Interviewee:

Name:
Organisation:
Address:
Phone:
Fax:
E-mail:
Website:

Question 1:

Which of the following environments/interests do you identify with?

a) Costal sea (the Gulf of Trieste, Adriatic Sea);

b) Soca/Isonzo catchment;

c) Idrijca catchment;

d) other: _____

Question 2:

Do you know about pollution in the Gulf of Trieste?

a) Yes

b) No

c) Partially

d) Only by media

Question 3:

Which type of pollution do you consider very important, important and less important in the Gulf of Trieste?

a)	Organic	very important	important	less important
b)	Algae	very important	important	less important
c)	toxic to marine organisms	very important	important	less important
d)	mercury	very important	important	less important
e)	other	very important	important	less important

Question 4:

Does any of the types of pollution specified above directly or indirectly influence your interests in the Gulf of Trieste?

a) Yes

b) No

c) Don't know

(The current quality of water in the Gulf of Trieste is from the economic and health point of view the main reason for reducing the input of mercury in Soca/Isonzo river. The formation of methyl mercury and its accumulation in fish and other organisms represents a health risk to the consumer. Reduction of mariculture as a measure for reducing the risk brings social and economic questions and dilemas.)

Question 5:

How important is the problem of mercury to you?

a) Very important

b) Important

c) Not important

Do you think wider political support is needed for solving this problem? ? Who should solve the problem? Explain.

Question 6:

Whose interests do you think are opposed to your view on the pollution of Gulf of Trieste and its reduction? How are these interests different? (The question is mainly directed to industrial pollution sources and local communities).

a) Municipalities

b) Industry

c) Ports

d) Other _____

Question 7:

What is the extent of your contribution to mercury accumulation in the Gulf of Trieste?

a) High

b) Medium

c) Small

d) No contribution

Question 8:

Who suffers the highest economic damage, the highest health damage and who the highest environmental damage from mercury pollution?

	Economic damage	Health damage	Environmental damage	Integral damage
Population in Idrija region				
Population along the Soca/Isonzo river				

Fishermen in the Gulf of Trieste				
All fish and other maritime products consumers				
Other				
Don't know				

Question 9:

Have you already comunnicated with any of the persons who may be at risk due to mercury pollution in the region?

a) Yes

b) No

c) Don't know anybody at risk

Question 10:

Are you performing any measures to reduce the pollution of the Idrijca, Soca/Isonzo, and the Gulf of Trieste with mercury?

a) Yes (specify)

b) No

c) Don't know which are indirect contributors to this pollution

Question 11:

What should be done to reduce the accumulation of mercury in the Gulf of Trieste?

a) In Slovenia:

b) In Italy:

Question 12:

What policies should be adopted to promote the improvement of the situation?

a) Business As Usual (BAU)

b) Policy Target (PT)

c) Deep Green (DG)

d) Other

e) Nothing

What policies specified above would you define as impossible to use? Why?

Question 13:

Please define importance of the policies in terms of maintaining jobs (social consideration).

a)	BAU	very important	important	less important
b)	PT	very important	important	less important
c)	DG	very important	important	less important

Question 14:

Which measure seems to be most effective for reducing health risk due to exposure to contaminated food (fish) with mercury?

a) Pollution reduction

b) Reduction/prevention of intake of contaminated food

c) Health risk assessment

d) Costs and benefits

Question 15:

The representatives of the institutions listed below have already been asked these questions. Do you think the right institutions were chosen? In your opinion who should we also ask about these issues?

a) Fishermen organisation

b) Agricultural organisation

c) Industry

d) Tourist organisation

Institution already been asked these questions: Ministry of the Environment, Physical Planning and Energy of Slovenia; Ministry for Agriculture, Forestry and Nutrition; Municipality of Nova Gorica; Municipality of Idrija; Regional Development Agency; National Agency for Regional Development; Umanotera – NGO; Soca River Power Stations Nova Gorica; Agenzia Regionale per la Protezione dell'Ambiente – Regional Agency for Environmental Protection(ARPA); Municipality of Gorizia; University of Udine; University of Trieste, Port of Trieste

The interviewer:

Name:

Phone:

E-mail:

Date:

Annex C: EUROCAT Workshop – Rhine/Elbe Catchment (REBCAT)

GKSS, Geesthacht, Germany

21 - 22 June 2001

DRAFT MINUTES

Participants	**(Names, Institutions and duration of stay)**
Horst BEHRENDT	Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, 21.-22.6.
Franciscus COLIJN	Research and Technology Centre, Westcoast of Kiel University, Kiel, 21.-22.6
Alison GILBERT	Institute for Environmental Studies (IVM), Amsterdam, 21.-22.6.
Jürgen HOFMANN	Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, 21.-22.6.
Andreas KANNEN	Research and Technology Centre, Westcoast of Kiel University, Kiel,21.-22.6.
Jens KAPPENBERG	GKSS, Geesthacht, 21.-22.6.
Wietze LISE	Institute for Environmental Studies (IVM), Amsterdam, 21.-22.6.
Luca PALMERI	University of Padua, 21.6.
Wim SALOMONS	GKSS, Geesthacht, 21.6.
Wilhelm WINDHORST	Research and Technology Centre, Westcoast of Kiel University, Kiel, 21.-22.6

Thursday, 21.06.2001

1. Introduction and status report of IGB

The objective of the workshop was to present and discuss the actual status of the regional study REBCAT. Consecutively the discussions focused on linking the catchment models (MONERIS) with coastal models (ERSEM) and to establish the interface to the socioeconomic database (IVM). Horst Behrendt presented the results of calculated Nitrogen (N) and Phosphorous (P) loads of the Rhine/Elbe catchment with emphasis on the comparison between two models: MONERIS and PolFlow (Pollutant Flow model being used in the Ph.D. thesis from Marcel De WITT 1999: Nutrient fluxes in the Rhine and Elbe basin. – Netherlands Geogr. Studies 259: 1-162). While MONERIS is operating on a sub-basin scale with a minimum size of > 500 km^2, the PolFlow is based on grids with a spatial resolution of 1 km^2. Both systems use a time step of 5 years and are embedded in a GIS environment. In large catchments both models perform agreement with a mean deviation of < 20%. In smaller catchments however the deviation of both models increases and may reach values of > 80% deviation, in some cases even 100% and more. In general PolFlow shows a general trend to underestimate the nutrient loads.

A further result of long time series calculations is the time delay between measures of nutrient reduction and the measurable effect being very different in both river systems. The time delay in case of the Elbe river may reach up to 30 years while it is smaller in case of the Rhine river. The summarized observed transport of nutrients for

the last 30 years shows different reactions of both rivers. One example was the fate of the total N-input:
the retention in soil is in the range of 65% (Elbe) to 35% (Rhine), mainly depending on the percentage and spatial distribution of consolidated and unconsolidated rocktypes. This concerns also the observed transport in rivers.

2. Status report of IVM

Wietze Lise presented a model, which calculates the cost-effective joint N and P emission reduction in the Rhine river basin (for more details see Annex 1). The data were derived from the SQR project (Sustainability and environmental Quality in trans-boundary River basins). The main topic focused on the questions: simulation versus optimization as well as ecological indicators versus economic indicators. Problems of spatial equity and the timing of emission reductions (25-30 years) were discussed. Concerning the Business as Usual (BAU) scenario three alterations were suggested:

- Divided Europe (no market, no cooperation)
- European Coordination (mainly cooperation)
- Global competition (mainly market).

3. Stakeholder consultation (Policy Advisory Boards)

The REBCAT consortium discussed a list of stakeholders in order to set up the Policy Advisory Board (PAB). Different levels of PAB's were taken into account: International level (Tripartite agreement among Netherlands, Germany and Denmark for the Wadden Sea), national level (see Annex 2), NGO-level (WWF), province (Länder) level and local level. As a result of the discussion a list of stakeholders was created (see Annex 2). The strategy to contact the PAB-members was agreed as follows:

- formulation of a draft letter (responsible : IVM)
- dissemination of the draft letter to the REBCAT consortium by e-mail for proofreading and adding comments (responsible: IVM)
- formulation and fine-tuning of the official letter containing a common part and a specific part (responsible: all members of REBCAT consortium)
- initial phone contact (responsibilities see list in Annex 2)
- forwarding the official letter to the PAB members (responsibilities see list in Annex 2)

With regard to the holiday period the contact to PAB members should be installed as soon as possible.

4. Parameters and variables of MONERIS linked to anthropogenic activities

Horst Behrendt gave a general presentation of parameters and variables of MONERIS linked to anthropogenic activities. The list contains following parameters:

- fertilizer use
- livestock units
- Crops/yields
- Agricultural landuse
- erosion protection

- tile drainage
- daming
- atmospheric emissions
- sewer statistic
- Paved area
- Storage of sewers
- WWTP (type, claases, population connected)
- Industrial emissions.

5. Discussion: Interface between MONERIS and ERSEM

A crude attempt was discussed to link the models MONERIS and ERSEM. The main question is: How can we link mean average values (5 years means) with a monthly operating model? The first step is to define a mean seasonality based on a typical hydrological year. The spatial overlap of both models will be the Elbe rivercourse between Geesthacht and Brunsbüttel/Cuxhaven. Following tasks were defined :

- Definition/Calculation of transfer functions for nutrients between MONERIS and ERSEM
- Artificial resolution of year cycles (5 years means) in order to derive a seasonality (monthly values)
- Data processing of MONERIS data output to ERSEM data input

Each scenario will give for each parameter a result. The fine-tuning of creating the interface between MONERIS and ERSEM will be executed in close cooperation with Horst Behrendt 6 Jürgen Hofmann (IGB), Herrmann Lenhart (University of Hamburg) and Jens Kappenberg (GKSS). The following substances will be considered: nitrate, ammonium, ortho-phosphate, total organic carbon, total nitrogen, total phosporus. In addition also heavy metals will be implemented for the Elbe river basin, but not for the Rhine river.

6. Enlargement of the data base

The database for the Rhine delta was discussed:

- Should the catchment of the Maas river be included to REBCAT? The contribution of the Maas to the nutrient input to the Rhine delta is estimated to be 10% at least. IVM will contact local authorities to get informations on the availability of relevant data from the Maas and Schelde river basins.
- In contrast to the Elbe estuary the Rhine delta has no natural flow conditions. This must be considered in the calculations of scenarios.
- The inputs from the Rhine delta up to the Danish borderline should be implemented to the database (including Weser and Ems river)
- Wim Salomons reminded the participants that both forecasting and hindcasting are part of the project.

7. Status report of GKSS

Jens Kappenberg presented the status of the contribution by GKSS. It is planned to employ one socioeconomic scientist for the EUROCAT project. GKSS will come to a decision for a qualified scientist within next week. IVM pointed out that the supply with socioeconomic data is urgent especially for the Elbe catchment.

8. Status report of CAU/FTZ

Franciscus Colijn presented the status of the contribution by CAU/FTZ. Unfortunately the designated socioeconomic scientist for the EUROCAT project will not acceed his position. CAU/FTZ will continue with the job advertisement. The major issues related to the Elbe river are eutrophication, oil spills, climate change and nature protection (impact on the coast). With regard to nature protection in the Elbe estuary the major stakeholder is the environmental agency (Naturschutzbehörde). The Quality status report in the Wadden Sea was published recently. Since the 1980's measurements on phosphate were carried out by the federal maritime and hydrographic agency (Bundesamt für Seeschiffahrt und Hydrographie, BSH). These data are available at the BSH and should be used for REBCAT, because the interaction of water and sediment in the German Bight (Deutsche Bucht) was neglected up to now. Substantial loads for nutrients have been important since long (historical) periods and should be taken into consideration. The relevant data are available for the period sine the 1950's as mentioned by Horst Behrendt.

End of 21.06.2001

Friday, 22.06.2001 (Continued)

9. Discussion: Linkage to socioeconomic scenarios

IVM's interests focus on the optimum reduction in the sense of a ranking of different reduction scenarios. Based on policy documents one target is a 50% reduction within 30 years. Given a certain target, the costs and the loads have to be calculated by stepwise iteration. Real loads computing with MONERIS will be IGB's task.
Before starting with scenarios, the following activities need to be defined:

- Delineation of catchment areas
- Exact description of scenarios (Green, Half-green, Business As Usual)
- Defining of transfer functions between the models of IGB (MONERIS) and IVM
- Consideration of possible variability of hydrological years (dry year/wet year) and their socioenomic activities/conditions,
- Valuation of measures (cost functions)
- Socioeconomic data input (livestock number etc.) and its implementation to scenario conditions
- Consideration of spatial changes (land use etc.) in the river catchments
- Consideration of background policies (set of measures will cause a change of numbers)
- Regionalization of costs from GREEN scenarios (equity issue)

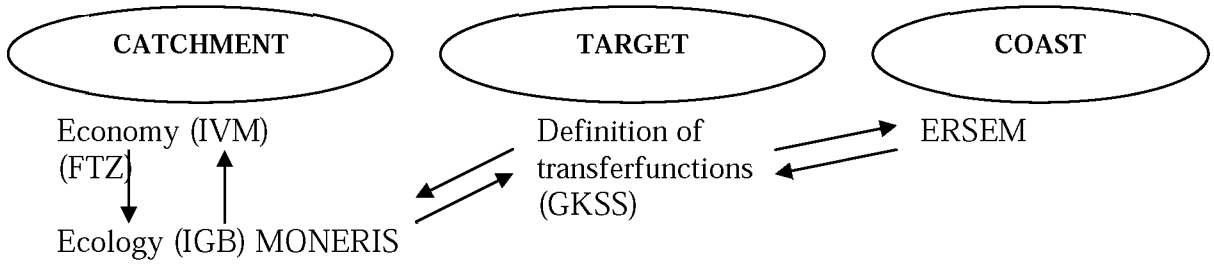


Fig. 1: Linkage of models

It was agreed that all models (linkage see Fig. 1) will run with following boundary conditions:

1985 = reference year
1995 = base year
2025 = time horizon

The output will be created in steps of every 10 years until the year 2025. IGB and IVM will coordinate the optimization and interaction of their models during an internal meeting (in Berlin or Amsterdam).

Horst Behrendt presented an example of possible changes of P load and concentrations of the Havel river below Berlin by different scenarios. Considering target loads and cost effects the introduction of microfiltration was the optimum solution in that special case.

10. Discussion: Tasks and Deliverables

Horst Behrendt described the list of tasks and deliverables according to the description of work:

- Task 1.1 to be finished in April 2002
- Task 1.4 to be finished in April 2002
- Task 2.2 to be finished in July 2001
- Task 2.4 to be finished in April 2002
- Deliverable 4.1 will be completed from IGB in cooperation with RCJ (Research Center Jülich) in Sept. 2002
- D 5.1 to D 5.3 (the time schedule will be put on the EUROCAT homepage by GKSS)

11. Conclusions and next steps

All models must be ready to run at the beginning of 2003. The analysis of output should be completed up to November 2003. For the completion of the tasks (as mentioned in chapter 10) the contribution of RIKZ (Remi Laane) is needed.
The next meetings will take place :

09 July 2001	Amsterdam (for WP coordinators only)
October 2001	WP 4 meeting in Berlin at IGB
November 2001	Family meeting in Italy, which is also the next REBCAT meeting

Annex 1: List of publications made available to participants

LISE, W. & van der VEEREN, R. 2001: Cost-Effective nutrient emission reductions in the Rhine River basin. - Institute for Environmental Studies (IVM), Amsterdam: 1-43. (several reprints were distributed by Wietze Lise during the REBCAT workshop)

Data requirements for MONERIS (five CD-ROM's were distributed by Jürgen Hofmann during the Indicator Workshop on 20.06.01)

Annex 2: List of stakeholders

List of Stakeholders as discussed on 22.06.2001