



**Improving the system of indicators used in monitoring and evaluation**

*12/ 02.10.2009*

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Ministry of Public Finance  
Authority for Coordination of Structural Instruments (ACIS)

**Improving the system of indicators used in monitoring and evaluation**

**Activity 1.1 Analysis of the system of indicators used in monitoring and evaluation**

**SOP Environment**

Contract number: 12/ 02.10.2009  
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## OPERATIONAL PROGRAMME ENVIRONMENT

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1.	NEEDS ASSESSMENT .....	3
1.1.	<i>General design of the indicators system</i> .....	3
1.2.	<i>Institutional set-up</i> .....	4
2.	ANALYSIS OF THE INDICATORS SYSTEM .....	5
2.1.	<i>Coverage of the indicators system</i> .....	5
2.1.1.	Socio-economic environment .....	5
2.1.2.	Objectives covered .....	8
2.1.3.	intervention Logic .....	27
2.1.4.	Core indicators .....	57
2.2.	<i>Balance</i> .....	60
2.3.	<i>Manageability</i> .....	63
2.3.1.	Overview .....	63
2.3.2.	Defining indicators .....	64
2.3.3.	Collecting indicators .....	65
2.3.4.	Processing and measuring indicators .....	66
2.3.5.	Progress monitoring .....	66
2.3.6.	Communication .....	67
3.	ANALYSIS OF THE INDIVIDUAL INDICATORS .....	96
4.	RECOMMENDATIONS .....	97
4.1.	<i>Needs assessment</i> .....	97
4.2.	<i>Analysis of the indicators system</i> .....	98
4.3.	<i>list of indicators used as parameters of smis</i> .....	99

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## 1. NEEDS ASSESSMENT

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The “Needs assessment questionnaire” was distributed to SOP Environment (SOP ENV) stakeholders (MA, IBs) but only one response was received, from the MA. The SOP ENV section of the questionnaire was also completed by one ACIS representative. Therefore, the opinions provided through the questionnaire cannot be considered representative but they offer a fair view of the main positive and negative aspects of the SOP Environment system of indicators.

As presented in the Methodology chapter, stakeholder views are deliberately reported as received. This section does not comment on their accuracy, validity or feasibility. However, it does provide preliminary conclusions (in text boxes) as “consultants’ perspective” in the form of preliminary conclusions deriving from the views of the stakeholders.

Findings are presented in two sub-sections: (1) general design of the indicators system of SOP ENV, which includes observations for individual indicators and (2) institutional set-up, including references to resources, SMIS usage and communication.

The opinions expressed through the questionnaires and the outcomes of the analysis exercise (as presented in the next chapters) were the starting point in formulating the conclusions and recommendations concerning the SOP ENV system of indicators.

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### 1.1. GENERAL DESIGN OF THE INDICATORS SYSTEM

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In respect to relevance, the two respondents consider that, generally, the SOP ENV indicators system is relevant both at PA level and for the overall Programme. However, they made specific remarks on different individual indicators that need improvement. Particularly, the ACIS representative pointed out the indicators that are not in accordance with the ones included in the NSRF.

Concerning the appropriateness of the individual indicators established at different levels (OP, PA, project) some comments have been made in relation to their:

- Inaccurate definition (e.g. the indicator “*Types of brochures/leaflets*” was considered ambiguous and “*Information and publicity materials*” was regarded as difficult to quantify – see answers to Q2.4);
- Insufficient coverage (for the *Priority Axis Technical Assistance*, one respondent noted the absence of indicators that can monitor the physical and financial progress of all types of projects - see answers to Q2.2);
- Lack of correlation with NSRF and OPTA for TA indicators (see scoring and comments in Annex 1 to the questionnaire and answers to Q3.3)

Concerning the integration of EU core indicators into the SOP ENV indicators system, there was a general understanding that initially they were not included into the OP but were added later, as supplementary indicators, after consultations between SOP ENV MA and ACIS. The MA representative considers that all EU requirements are met and the common core indicators are integrated into the OP (see answers to Q2.7).

Regarding the balance between the different types of indicators, the MA representative considers that the system does not ensure a proper equilibrium for the interventions to be correctly monitored, without offering any further details (see answer to Q2.5). At the same time, the respondent considers that the current indicators system does not provide an

appropriate connection between the different levels of monitoring: project / operation / programme / NSRF.

### ***Preliminary conclusions***

- a) *Based on the opinions expressed by the MA representative, there is a scope for further improvement of the indicators system for SOP ENV, in terms of coverage, balance and manageability.*
- b) *Individual indicators must also be reviewed and improved.*
- c) *There is a need to ensure a proper causal link between different levels of monitoring: project, programme and NSRF.*
- d) *Given the lack of clear understanding of the relationship between project and programme level indicators, as well as between the different types of indicators, there is an obvious need for training and instructions/ procedures specifically designed for working with indicators. Specifically, additional training and consultation related to SMIS use is a valid need, confirmed by the respondents.*

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## 1.2. INSTITUTIONAL SET-UP

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The MA SOP ENV representative responding to the survey acknowledged the existence of procedures relevant for using indicators. While applying procedures was considered to be quite simple for collecting and reporting, there were difficulties in defining and communicating indicators. At the same time, providing guidance on working with indicators was also perceived as a challenge.

The respondent considered that the inter-institutional communication is good and it is made without deficiencies, (see answer to Q3.5). Concerning SMIS functioning, no improvements were considered necessary (see answers to Q3.8). This was also the case for resources dedicated to working with indicators, no deficiency being signalled. Still, the respondent considered that the responsibilities related to indicators collection, processing and reporting were not sufficiently clear.

Training, guidelines and instructions were also considered necessary, so as to improve working with indicators, since, until the time of the survey, no employee responsible with TA had been involved in training sessions (see answers to Q4.5).

The priorities identified by the respondents refer to (see answers to Q5.1 and Q5.2):

- Common approach on TA indicators across all OPs;
- Completing the list of indicators so as to include indicators for monitoring all interventions under PA 6 (such as IT projects);
- Training of the staff responsible for defining, collecting, analysing and monitoring indicators for PA 6.

### ***Preliminary conclusions***

- a) *Training and guidelines are necessary for improving the work with indicators, from defining them to collection, monitoring and reporting. Lack of training and instructions may be one of the causes for which some of the functions are considered more difficult.*
- b) *A common approach regarding TA indicators is also necessary.*

c) *As for other OPs, the issue of resources needs to be considered both in terms of available staff with adequate competency to manage indicators and related to their respective financial compensation, which should provide a minimum level of professional motivation;*

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## 2. ANALYSIS OF THE INDICATORS SYSTEM

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### 2.1. COVERAGE OF THE INDICATORS SYSTEM

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#### 2.1.1. SOCIO-ECONOMIC ENVIRONMENT

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The main purpose of context indicators was to provide information on the socio-economic situation and in the case of SOP ENV to provide primarily information on the situation in the environment sector. Although not defined as such, context indicators were used in the programming phase in order to identify and quantify the needs of the sector. In the implementation phase they are relevant in order to monitor the overall development in relevant areas of the sector.

In the SOP ENV a list of context indicators was not provided, but several potential environment specific context indicators could be identified through the screening exercise carried out by us at the level of the socio-economic analysis and SWOT in the programming document.

We found that the chapters of the SOP ENV “Current situation” and “SWOT Analysis” provide a comprehensive outline of the situation of the environment sector in Romania. As during the programming period the statistical database was weak or outdated in the field of environment, creating an indicator system for SOP ENV was a real challenge.

Thus, we may draw certain ***preliminary conclusions*** as follows:

- Currently the monitoring system of the SOP ENV in Romania does not include formally any context indicators. This situation does not allow proper contextualisation of the programme interventions;
- The absence of context indicators limits the possibility for a continuous check on the relevance of identified needs and on the implementation of interventions financed from the OP;
- Strategic reporting at the programme level (annual implementation reports) is missing an important source of useful information.

Therefore, it would be advisable to consider ***the formal inclusion in the monitoring system of a number of context indicators*** reflecting the identified thematic fields addressed by the programme.

The analysis of the current situation described in SOP ENV offered us a clear view on the most important sectoral context indicators and their history.

In addition, a number of environment-related OPs from other EU Member States were analysed<sup>1</sup>, to check for international good practice. Thus, the international benchmark analysis revealed that context indicators were defined in the environment operational programmes for Poland, Spain, and Slovakia<sup>2</sup>. As a result, the identified indicators used by other MS were mapped against the five main themes (fields) targeted by the SOP ENV in Romania in a comparative table presented in the following pages (Figure 1). Context

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<sup>1</sup> OPs in full text were consulted for the following MS: Bulgaria, Czech Republic, Hungary, Malta, Poland, Slovakia, Slovenia, Spain (2007-2013);

<sup>2</sup> A more detailed presentation of each OP consulted is found in the Annexes.



indicators revealed by the international benchmarking analysis to be relevant for the Romanian SOP ENV/strategic objectives were taken into account.

Finally, the following important references were considered in determining the proposed list of potential context indicators:

- a) SWOT analysis; all four sub-sections (strengths, opportunities, weaknesses and threats) offer a series of the issues that have to be maximised or, on the contrary, alleviated, as well as of the ones that have to be taken into account or risk prevented;
- b) the “Analysis of the current situation” chapter provides information on the most important sectoral context indicators, history and perspectives;
- c) objectives and results set-up by the National Strategy for Sustainable Development 2013-2020-2030 (NSSD) and the National Strategy for Waste Management 2003-2013 (NSWM) were analysed, as they reflect global interventions on environment at national level; SOP ENV is one of the programmes that leads to the achievement of targets (strategic objectives) established in the national strategies; these targets should also be reflected by relevant context indicators within the SOP ENV and measured as such.

Furthermore, the availability of the proposed indicators from official statistical sources was considered (e.g. National Institute of Statistics, Ministry of Environment database, local authorities’ databases, Romanian Police etc.).

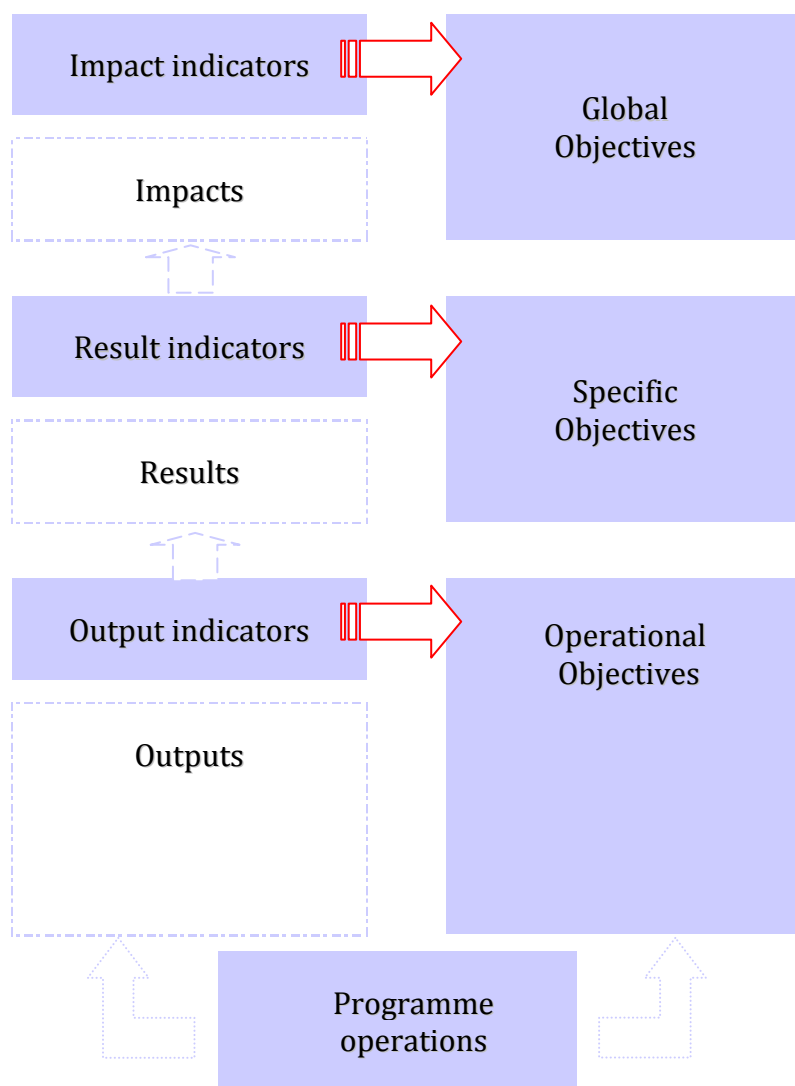


FIG 1 PROPOSED LIST OF CONTEXT INDICATORS FOR SOP ENV

Context indicators suggested for the SOP Environment Romania	Rationale	
	SWOT analysis	Strategic general/specific objectives
Volume of treated waste water / volume of collected waste water	(W) low access of the population to centralized water and wastewater systems comparing with EU countries	(SSO – NSSD) Improvement of quality and access to water and waste water infrastructure by providing water supply and sewage services in most urban areas by 2015 (...)
Average tariffs for urban water supply/sanitation services	(W) inefficient water management structures, especially in smaller towns	
Share of population supplied with drinking water from public water supply network	(W) low access of the population to centralized water and wastewater systems comparing with EU countries	(SSO – NSSD) Improvement of quality and access to water and waste water infrastructure by providing water supply and sewage services in most urban areas by 2015 (...)
Percentage of urban agglomerations with wastewater treatment plants		
Waste selectively collected: glass, plastic, paper & carton, mixed / total of waste collected	(W) low level of selective collection; insufficient development of waste recycling and recovery market	(SGO 8.1 – NSWMM) Capitalisation of all possibilities of technical and economic nature related to waste valorisation (SSO 9.2.3 – NSWMM) Introduction and extension of waste selective collection at generation source
Ratio of population covered by sanitation services – urban/rural		(SSO 4.1.3 – NSWMM) Improvement of economic-financial mechanisms for municipal waste management (tax calculation, special national programmes) (SSO 9.1.1 – NSWMM) Extension of waste collection systems in urban and rural areas
Emissions of greenhouse effect gases	(W) strong air pollution caused by large combustion plants and high consumption of primary resources (especially fossil fuels) and high specific emissions of NOx and SO2 especially resulted from LCPs	(SGO – NSSD) Prevention of climate change through limitation of greenhouse gas emissions, as well as of their negative effects on society and environment (SSO – NSSD) Reduction of the negative impact on environment and decrease of climate changes caused by urban heating systems in most polluted localities by 2015.
Seaside losses due to erosion	(W) Linked to weakness in SWOT analysis related to <i>serious coastal erosion damage</i>	(SSO – NSSD) Reduction of natural disasters emerging risks on population by preventive measures taken in most vulnerable areas

## 2.1.2. OBJECTIVES COVERED

A key tool in analysing the consistency of the indicators at system level is to check their correlation with the objectives set at different levels of the OP. The next figure describes how an intervention will contribute to the achievement of the operational, specific and global objectives of the Operational Programme.



As it could be seen in the figure, when the programme operation (a project or a group of projects) is implemented, the operational objectives can be achieved and measured as outputs. The subsequent results are the immediate effects of operations, which contribute to the achievement of the specific objectives. Impacts should contribute to reaching the overall objectives of the programme.

The indicators are used to assess at each level (output, result, impact) how far the expected objectives have been achieved.

By correlating the indicators with objectives it was expected to identify:

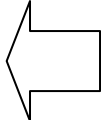
- 1) Indicators that remain “outside” objectives;
- 2) Indicators that were inappropriately assigned to a certain level of objectives;
- 3) Objectives that cannot be measured for lack of indicators;



The analysis consisted in outlining the objectives of OP ENV as well as the breakdown from global, to specific and operational objectives (at PA/KAI level).

According to the objectives tree of SOP ENV, the general objective of the OP is “to improve the living standards and environmental standards, aiming, in particular, on meeting the environmental *community acquis*.”

This is further broken down into five specific objectives (SO).

S01:	<i>Improving <b>quality and access to water and wastewater infrastructure</b>, by providing water supply and sanitation in most urban areas by 2015 and establishing effective regional structures for the management of water and wastewater systems.</i>	 TECHNICAL ASSISTANCE
S02:	<i>Development of <b>sustainable waste management</b> by improving management and reducing the number of historically contaminated sites in at least 30 counties by 2015.</i>	
S03:	<i>Reducing the negative environmental impact and mitigation of climate change caused by <b>urban heating systems</b> in the most polluted localities by 2015.</i>	
S04:	<i>Protection and improvement of <b>biodiversity and natural heritage</b> through protected areas management, including the implementation of Natura 2000 network.</i>	
S05:	<i><b>Reducing the risk of natural disasters</b> affecting the population, by implementing preventive measures in most vulnerable areas by 2015.</i>	

Technical assistance will support specific measures to address the main needs as regard the administrative management of the programme and the strengthening of capacity of the structures involved in the process of programming, implementation, monitoring, evaluation and control, as well as information and publicity activities.

By screening the SOP ENV, the following operation objectives were identified by each priority axis (PA) in order to achieve the above mentioned specific objective:









PA1:	<ul style="list-style-type: none"> <li>▪ <i>expanding / upgrading water and wastewater systems</i></li> </ul>
PA2:	<ul style="list-style-type: none"> <li>▪ <i>development of integrated waste management and waste management infrastructure expansion</i></li> <li>▪ <i>rehabilitation of historically contaminated sites</i></li> </ul>
PA3:	<ul style="list-style-type: none"> <li>▪ <i>rehabilitation of district heating systems in the hot areas (hot spot)</i></li> </ul>
PA4:	<ul style="list-style-type: none"> <li>▪ <i>infrastructure development and management plans to protect biodiversity and Natura 2000</i></li> </ul>
PA5:	<ul style="list-style-type: none"> <li>▪ <i>flood protection</i></li> <li>▪ <i>reduction of coast erosion</i></li> </ul>

**The second step was to map the link between the objectives and existing output and result indicators in the SOP ENV and related FDI**, so as to provide answer to the three tiers of analysis set out in the beginning of the subsection. For the purpose of current analysis the link between indicators and objectives is graphically illustrated in the tables below and it starts with the programme interventions (activities).

FIG 2 COVERAGE OF OPERATIONAL OBJECTIVES OF SOP ENV

	<b>INTERVENTIONS</b>	<b>OUTPUT INDICATORS</b>	<b>OPERATIONAL OBJECTIVES</b>
<b>PA 1. Expanding and upgrading water and wastewater systems</b>	Construction/modernisation of water drinking sources	<i>no indicator defined</i>	<b>Expanding/upgrading water and wastewater systems</b>
	Construction/rehabilitation of drinking water treatment stations	<ul style="list-style-type: none"> <li>(S) Treatment plants new and rehabilitated (no.)</li> </ul>	
	Extension/rehabilitation of drinking water/sewage networks and corresponding civil structures, including rehabilitation of water pipes	<ul style="list-style-type: none"> <li>(S) Length of water supply network - newly built (km)</li> <li>(S) Length of water supply network - rehabilitated (km)</li> <li>(S) Length of sewage network - newly built (km)</li> <li>(S) Length of sewage network - rehabilitated (km)</li> </ul>	
	Construction/modernisation of waste water treatment plants (WWTP)	<ul style="list-style-type: none"> <li>(P) Wastewater treatment plants new / rehabilitated (number)</li> <li>(S) Wastewater treatment plants new and rehabilitated (no.)</li> </ul>	
	Construction/rehabilitation of treatment facilities for the sludge generated in WWTP	<i>no indicator defined</i>	
	Metering, laboratory equipment, loss detection equipment, etc.	<i>no indicator defined</i>	
	TA for project preparation, management and supervision, publicity ,institutional governance improvement	<i>no indicator defined</i>	








PA 2. Development of integrated waste management and waste management infrastructure expansion

INTERVENTIONS	OUTPUT INDICATORS	OPERATIONAL OBJECTIVES
Purchase and installation of selective collection systems	<i>no indicator defined</i>	
Construction, extension, rehabilitation or modernisation of municipal integrated waste management systems, such as sorting, transport, recycling, collecting, composting facilities, transfer, treatment and municipal waste disposal stations	<ul style="list-style-type: none"> <li>▪ (P) Number of new integrated waste management systems at county / regional level (number)</li> <li>▪ (S) New waste management systems</li> <li>▪ (S) Extended waste management systems (no.)</li> </ul>	
Recovering of the gas generated in landfills	<i>no indicator defined</i>	
Construction of adequate facilities for municipal hazardous waste (medical, electric and electronic waste, etc.) and other specific waste categories (construction and demolition waste, etc.), including purchase and installation of equipment for municipal waste management facilities, and other specific categories of waste	<i>no indicator defined</i>	
Closure of non-compliant landfills, inclusively of the leachate collection system and biogas extraction system	<ul style="list-style-type: none"> <li>▪ (P) Old closed waste landfills in rural areas (small) - number</li> <li>▪ (P) Old closed municipal waste landfills in urban areas (number)</li> <li>▪ (S) Waste landfills (old non-compliant) in rural areas (small), closed (no.)</li> <li>▪ (S) Municipal waste landfills (old) in urban areas, closed (no.)</li> </ul>	
TA for project preparation, management and supervision, publicity and public awareness campaigns(...), institutional governance improvement, tendering and contracting sanitation operators	<i>no indicator defined</i>	
Restoration and cleaning of the land using appropriate measures for specific categories of contaminated sites;	<ul style="list-style-type: none"> <li>▪ P) Pilot projects for the rehabilitation of historically contaminated sites (no.)</li> <li>▪ (S) Rehabilitated area - historically contaminated sites (ha)</li> </ul>	
Technical assistance for project preparation, option studies, management, supervision and publicity	<i>no indicator defined</i>	

**Development of integrated waste management and waste management infrastructure expansion**

**Rehabilitation of historically contaminated sites**

**PA 3. Pollution reduction and mitigation of climate change by restructuring and renovating urban heating systems to achieve energy efficiency targets in areas most affected by pollution**














INTERVENTIONS	OUTPUT INDICATORS	OPERATIONAL OBJECTIVES
<i>Introduction of BAT (best available technologies) to reduce SO<sub>2</sub>, NO<sub>x</sub> and particulate matter</i>	<ul style="list-style-type: none"> <li>(S) Projects for air quality improvement (no.)</li> </ul>	
<i>Rehabilitation of boilers and turbines</i>	<ul style="list-style-type: none"> <li>(S) Projects for air quality improvement (no.)</li> </ul>	
<i>Introduction of improved metering system</i>	<i>no indicator defined</i>	
<i>Rehabilitation of non-compliant slag and ash deposits</i>	<ul style="list-style-type: none"> <li>(S) Projects for air quality improvement (no.)</li> </ul>	
<i>Rehabilitation of hot water and heat distribution networks (including redesign of networks...)</i>	<ul style="list-style-type: none"> <li>(P) Central heating systems rehabilitated (number)</li> <li>(S) Central heating systems rehabilitated (no.)</li> </ul>	 <p><b>Rehabilitation of district heating systems in the hot areas (hot spot)</b></p>
<i>Technical assistance for project preparation, option studies elaboration, management, works supervision and publicity for the project, including public awareness campaigns</i>	<ul style="list-style-type: none"> <li>(P) Options studies elaborated (number)</li> <li><i>no specific indicator defined for project preparation and management, works supervision, project publicity including public awareness campaigns</i></li> </ul>	 

PA 4. Implementation of appropriate management systems for environmental protection

INTERVENTIONS	OUTPUT INDICATORS	OPERATIONAL OBJECTIVES
Support for the preparation / review of management plans, scientific studies, inventory, mapping	<ul style="list-style-type: none"> <li>• (P) Protected areas and Natura 2000 sites, with management plans in force / approved (number)</li> <li>• (S) Management plans elaborated/ revised (no.)</li> <li>• <i>no specific indicators for scientific studies, inventory, mapping</i></li> </ul>	
Training and strengthening the institutional capacity of management bodies of Natura 2000 sites and protected areas	<ul style="list-style-type: none"> <li>• (S) Participant training days - beneficiaries, within nature conservation activities (no.)</li> <li>• (S) Participant training days - other structures within nature conservation activities (no.)</li> </ul>	
Ecological restoration projects of habitats and species	<ul style="list-style-type: none"> <li>• (S) Habitats ecologically rehabilitated (no.)</li> </ul>	
Building and improving infrastructure of national protected areas and Natura 2000 sites (building information centres and information panels, risk management - fire prevention and control, etc.);	<ul style="list-style-type: none"> <li>• (S) Proposed sites in Natura 2000 network benefiting from measures implementation (no.)</li> <li>• <i>no specific indicator defined for interventions dedicated to the national protected areas</i></li> </ul>	<p><b>Infrastructure development and management plans to protect biodiversity and Natura 2000 sites</b></p>
Supporting biodiversity: reducing impact of infrastructure on the species affected by fragmentation of the landscape (development of measures designed to overcome barriers on rivers and highways)	<p><i>no indicator defined</i></p>	
Establish monitoring systems for Natura 2000 sites and protected areas, including infrastructure and equipment for monitoring the conservation status of natural habitats and of wild flora and fauna	<ul style="list-style-type: none"> <li>• (S) Implemented/ extended IT systems within nature conservation activities (no.)</li> </ul>	
Preparation of information materials and publicity and awareness for protected areas and Natura 2000 sites	<ul style="list-style-type: none"> <li>• (S) Communication and promotional events within nature conservation activities (no.)</li> <li>• (S) Information and publicity materials within nature conservation activities (no.)</li> </ul>	
Purchase of land with significant value in terms of biodiversity in order to turn it into public property	<p><i>no indicator defined</i></p>	

PA 5. Implementation of adequate infrastructure for natural risk prevention in most vulnerable areas

INTERVENTIONS	OUTPUT INDICATORS	OPERATIONAL OBJECTIVES
<p>Infrastructure for flood prevention and reduction of the destructive consequences floods, including measures to enhance the morphology of the elements of water, construction and rehabilitation of retention polders, green fences, irrigation strips, deviation curves</p>	<ul style="list-style-type: none"> <li>• (P) Projects approved on floods protection (number)</li> <li>• (S) Protected area through protection works against floods risk (km<sup>2</sup>)</li> <li>• (S) Projects for natural risks prevention (no.)</li> </ul>	<p><b>Flood protection</b></p>
<p>Development of hazard maps and flood risk, plans and measures, including public information and education in risk reduction</p>	<ul style="list-style-type: none"> <li>• (P) Projects approved on floods protection (number)</li> <li>• (S) Projects for natural risks prevention (no.)</li> </ul>	
<p>Technical assistance for project preparation, management, supervision and publicity</p>	<p><i>no indicator defined</i></p>	
<p>Rehabilitation of the Black Sea coast area affected by erosion, including:</p> <ul style="list-style-type: none"> <li>- consolidation of existing works;</li> <li>- dismantling of existing works for their rehabilitation / extension</li> <li>- sanding and creating new beaches;</li> <li>- construction of dams and dikes for sand retention;</li> <li>- construction / rehabilitation of longitudinal submerged breakwaters for waves energy dissipation and reduction of sediment transport into the sea;</li> <li>- dams for water stabilization;</li> <li>- construction of access road;</li> <li>- sand transport facilities</li> </ul>	<ul style="list-style-type: none"> <li>▪ (P) Length of rehabilitated seashore (km)</li> <li>▪ (S) Length of rehabilitated seashore – natural risks prevention (km)</li> </ul>	<p><b>Reduction of coast erosion</b></p>
<p>Technical assistance for project preparation, management, supervision and publicity</p>	<p><i>no indicator defined</i></p>	

INTERVENTIONS	OUTPUT INDICATORS	OPERATIONAL OBJECTIVES
Support for the Monitoring Committee meetings	<ul style="list-style-type: none"> <li>(P) Meetings of the Monitoring Committee organised (no./year)</li> <li>(S) Meetings of relevant committees and working groups (no.)</li> </ul>	
Preparing the necessary documents / strategies for projects identification and justification	no indicator defined	
Preparation selection, evaluation and monitoring of the Programme and individual operations, including support for the IBs for such activities; using advisory services, where appropriate	<ul style="list-style-type: none"> <li>(P) Call for proposals supported by TA (no.)</li> <li>(P) Applications assessed with TA support (no.)</li> <li>(P) Evaluation reports elaborated (no.)</li> <li>no indicator defined for monitoring the programme and individual operations</li> </ul>	 
Preparation of audit, controls and spot checks of projects financed through SOP ENV	no indicator defined	
Evaluation of SOP ENV, including continuous assessment	no indicator defined	
Elaboration of studies, analyses and reports focused on monitoring the impact of program implementation, analysis of the implementation structures efficiency, identification of programme's weaknesses in order to formulate recommendations to improve efficiency of the programme management	<ul style="list-style-type: none"> <li>(S) Studies, analyses, reports, strategies (no.)</li> <li>(S) Guidelines and other methodological documents (no.)</li> </ul>	 <p><b>Support for the management and evaluation of SOP ENV</b></p>
Training activities on structural funds management for the MA, IBs, beneficiaries of projects financed through SOP ENV	<ul style="list-style-type: none"> <li>(P) Staff trained (no./year)</li> <li>(S) Participant training days – composed (no.)</li> <li>(S) Participant training days – beneficiaries (no.)</li> <li>(S) Participant training days – managing structures (no.)</li> <li>(S) Participant training days – other structures (no.)</li> </ul>	
Purchase of specific IT applications for SOP ENV	no indicator defined	
Remuneration of temporary staff to implement the above-mentioned responsibilities	no indicator defined	
Thematic studies related to the implementation of SOP ENV; thematic studies necessary to elaborate the environment strategy for the next programming period	<ul style="list-style-type: none"> <li>(P) Thematic studies/strategies elaborated</li> </ul>	
Demonstration activities in order to apply modern solutions for integrated water management and innovative environmental technologies related to the KAIs of the SOP ENV	no indicator defined	
Support for establishment of platforms for the exchange of information and dissemination	<ul style="list-style-type: none"> <li>Events focused on experience exchange related to funds implementation and thematic aspects (no.)</li> </ul>	



<p><i>Developing and implementing training/educational programs for staff adaptation to innovative technologies</i></p>	<ul style="list-style-type: none"> <li>▪ (P) Staff trained (no./year)</li> <li>▪ (S) Participant training days – composed (no.)</li> <li>▪ (S) Participant training days – beneficiaries (no.)</li> <li>▪ (S) Participant training days – managing structures (no.)</li> <li>▪ (S) Participant training days – other structures (no.)</li> </ul>	
<p><i>Develop and implement the Communication Plan of SOP ENV</i></p>	<p><i>no indicator defined</i></p>	
<p><i>Consulting services for the elaboration of information materials, preparation of evaluation reports for SOP ENV</i></p>	<ul style="list-style-type: none"> <li>▪ (S) Information and publicity materials(no.)</li> <li>▪ <i>no indicator defined for the preparation of evaluation reports</i></li> </ul>	
<p><i>Information and publicity - organization of seminars, preparation of information materials, developing and updating the website of SOP ENV, distributing information materials and leaflets for the public, and for potential beneficiaries of projects financed through SOP ENV</i></p>	<ul style="list-style-type: none"> <li>▪ (P) Types of leaflets/brochures disseminated (number)</li> <li>▪ (P) Press conferences organised</li> <li>▪ (S) Information and publicity materials(no.)</li> <li>▪ (S) Mass-media campaigns (no.)</li> <li>▪ (S) Information requests received by the Information Centre (no.)</li> <li>▪ (S) Communication and promotion events (no.)</li> <li>▪ (S) Website visits (no.)</li> </ul>	<p><b>Support for information and publicity</b></p>



PA 1. Expanding and upgrading water and wastewater systems

INTERVENTIONS	RESULT INDICATORS	SPECIFIC OBJECTIVES
Construction/modernisation of water drinking sources	<ul style="list-style-type: none"> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> </ul>	
Construction/rehabilitation of drinking water treatment stations	<ul style="list-style-type: none"> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> </ul>	
Extension/rehabilitation of drinking water/sewage networks and corresponding civil structures, including rehabilitation of water pipes	<ul style="list-style-type: none"> <li>(P) Population connected to water services in a regional system (%)</li> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> <li>(S) Additional population connected to water supply services (no.)</li> <li>(S) Additional equivalent population connected to sewage services (no.)</li> </ul>	<p><b>Improvement of quality and access to water and wastewater infrastructure by providing the drinking water supply and sewage services in most urban areas by 2015, and</b></p>
Construction/modernisation of waste water treatment plants (WWTP)	<ul style="list-style-type: none"> <li>(P) Properly treated waste water (of the total waste water volume) - %</li> <li>(S) Population equivalent for which wastewater is treated according to NTPA 001 (no.)</li> </ul>	<p><b>establishment of efficient regional structures for the management of water/wastewater services</b></p>
Construction/rehabilitation of treatment facilities of the sludge generated in WWTP	<ul style="list-style-type: none"> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> </ul>	
Metering, laboratory equipment, loss detection equipment, etc.	no indicator defined	
TA for project preparation, management and supervision, publicity, institutional governance improvement	no indicator defined	



PA 2. Development of integrated waste management and waste management infrastructure expansion

INTERVENTIONS	RESULT INDICATORS	SPECIFIC OBJECTIVES
<i>Purchase and installation of selective collection systems</i>	<ul style="list-style-type: none"> <li>(P) Population benefiting from improved waste management systems (million inhabitants)</li> </ul>	<p><b>Development of sustainable waste management systems by improving the waste management and reducing the number of historically polluted areas in minimum 15 counties by 2015</b></p>
<i>Construction, extension, rehabilitation or modernisation of municipal integrated waste management systems, such as sorting, transport, recycling, collecting, composting facilities, transfer, treatment and municipal waste disposal stations</i>	<ul style="list-style-type: none"> <li>(P) Population benefiting from improved waste management systems (million inhabitants)</li> </ul>	
<i>Recovering of the gas generated in landfills</i>	<i>no indicator defined</i>	
<i>Construction of adequate facilities for municipal hazardous waste (medical, electric and electronic waste, etc.) and other specific waste categories (construction and demolition waste, etc.), including purchase and installation of equipment for municipal waste management facilities, and other specific categories of waste</i>	<i>no indicator defined</i>	
<i>Closure of non-compliant landfills, inclusively of the leachate collection system and biogas extraction system</i>	<i>no indicator defined</i>	
<i>TA for project preparation, management and supervision, publicity and public awareness campaigns(...),institutional governance improvement, tendering and contracting sanitation operators</i>	<i>no indicator defined</i>	
<i>Restoration and cleaning of the land using appropriate measures for specific categories of contaminated sites;</i>	<i>no indicator defined</i>	
<i>Technical assistance for project preparation, option studies, management, supervision and publicity</i>	<i>no indicator defined</i>	

**PA 3. Pollution reduction and mitigation of climate change by restructuring and renovating urban heating systems to achieve energy efficiency targets in areas most affected by pollution**

INTERVENTIONS	RESULT INDICATORS	SPECIFIC OBJECTIVES
<p><i>Introduction of BAT (best available technologies) to reduce SO<sub>2</sub>, NO<sub>x</sub> and particulate matter</i></p>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• (S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> <li>• (P) Reduction of SO<sub>2</sub> emissions from urban heating systems due to SOP interventions (tones)</li> <li>• (P) Reduction of NO<sub>x</sub> emissions from urban heating systems due to SOP interventions (tones)</li> <li>• (S) Reduction of SO<sub>2</sub> emissions (t)</li> <li>• (S) Reduction of NO<sub>x</sub> emissions (t)</li> <li>• (S) Rehabilitated thermal capacity (MWh)</li> </ul>	<p><b>Reduction of the negative impact on environment and decreasing climate changes caused by the urban heating systems in most polluted localities by 2015</b></p>
<p><i>Rehabilitation of boilers and turbines</i></p>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• (S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> </ul>	
<p><i>Introduction of improved metering system</i></p>	<p><i>no indicator defined</i></p>	
<p><i>Rehabilitation of non-compliant slag and ash deposits</i></p>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• (S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> </ul>	
<p><i>Rehabilitation of hot water and heat distribution networks (including redesign of networks...)</i></p>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• (S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> </ul>	
<p><i>Technical assistance for project preparation, option studies elaboration, management, works supervision and publicity for the project, including public awareness campaigns</i></p>	<p><i>no indicator defined</i></p>	

PA 4. Implementation of appropriate management systems for environmental protection

INTERVENTIONS	RESULT INDICATORS	SPECIFIC OBJECTIVES
Support for the preparation / review of management plans, scientific studies, inventory, mapping	<ul style="list-style-type: none"> <li>(S) Management plans implemented (no.)</li> </ul>	
Training and strengthening the institutional capacity of management bodies of Natura 2000 sites and protected areas	no indicator defined	
Ecological restoration projects of habitats and species	<ul style="list-style-type: none"> <li>(P) Surface of protected areas and Natura 2000 sites, benefiting from nature conservation measures (% of total surface of protected areas)</li> <li>S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)</li> </ul>	
Building and improving infrastructure of national protected areas and Natura 2000 sites (building information centres and information panels, risk management - fire prevention and control, etc.);	<ul style="list-style-type: none"> <li>(P) Surface of protected areas and Natura 2000 sites, benefiting from nature conservation measures (% of total surface of protected areas)</li> <li>S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)</li> </ul>	
Supporting biodiversity: reducing impact of infrastructure on the species affected by fragmentation of the landscape (development of measures designed to overcome barriers on rivers and highways)	no indicator defined	
Establish monitoring systems for Natura 2000 sites and protected areas, including infrastructure and equipment for monitoring the conservation status of natural habitats and of wild flora and fauna	<ul style="list-style-type: none"> <li>(P) Surface of protected areas and Natura 2000 sites, benefiting from nature conservation measures (% of total surface of protected areas)</li> <li>S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)</li> </ul>	
Preparation of information materials and publicity and awareness for protected areas and Natura 2000 sites	no indicator defined	
TA for project preparation, management and supervision, publicity, institutional governance improvement	no indicator defined	

**Protection and improvement of biodiversity and natural patrimony by supporting the management of protected areas, inclusively by implementing the Natura 2000 network**

PA 5. Implementation of adequate infrastructure for natural risk prevention in most vulnerable areas

INTERVENTIONS	RESULT INDICATORS	SPECIFIC OBJECTIVES
<p>Infrastructure for flood prevention and reduction of the destructive consequences floods, including measures to enhance the morphology of the elements of water, construction and rehabilitation of retention polders, green fences, irrigation strips, deviation curves</p>	<ul style="list-style-type: none"> <li>• (P) Population benefiting from floods protection projects (no. inhabitants)</li> <li>• (P) Reducing the incidence to floods risk (%)</li> <li>• (S) Population benefiting from measures implementation - natural risks prevention (no.)</li> </ul>	
<p>Development of hazard maps and flood risk, plans and measures, including public information and education in risk reduction</p>	<ul style="list-style-type: none"> <li>• (P) Reducing the incidence to floods risk (%)</li> <li>• (P) Population benefiting from floods protection projects (no. inhabitants)</li> <li>• (S) Population benefiting from measures implementation - natural risks prevention (no.)</li> </ul>	
<p>Technical assistance for project preparation, management, supervision and publicity</p>	<p><i>no indicator defined</i></p>	
<p>Rehabilitation of the Black Sea coast area affected by erosion, including:</p> <ul style="list-style-type: none"> <li>- consolidation of existing works;</li> <li>- dismantling of existing works for their rehabilitation / extension</li> <li>- sanding and creating new beaches;</li> <li>- construction of dams and dikes for sand retention;</li> <li>- construction / rehabilitation of longitudinal submerged breakwaters for waves energy dissipation and reduction of sediment transport into the sea;</li> <li>- dams for water stabilization;</li> <li>- construction of access road;</li> <li>- sand transport facilities</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Extension of coast area (%)</li> <li>▪ (S) Extended coast area – natural risks prevention (km<sup>2</sup>)</li> </ul>	
<p>Technical assistance for project preparation, management, supervision and publicity</p>	<p><i>no indicator defined</i></p>	

**Reduction of the emerging risk of natural disasters with effects on population by implementing prevention measures in most vulnerable areas by 2015**

INTERVENTIONS	RESULT INDICATORS	SPECIFIC OBJECTIVES
<i>Support for the Monitoring Committee meetings</i>	<i>no indicator defined</i>	
<i>Preparing the necessary documents / strategies for projects identification and justification</i>	<i>no indicator defined</i>	
<i>Preparation selection, evaluation and monitoring of the Programme and individual operations, including support for the IBs for such activities; using advisory services, where appropriate</i>	<i>no indicator defined</i>	
<i>Preparation of audit, controls and spot checks of projects financed through SOP ENV</i>	<i>no indicator defined</i>	
<i>Evaluation of SOP ENV, including continuous assessment</i>	<i>no indicator defined</i>	
<i>Elaboration of studies, analyses and reports focused on monitoring the impact of program implementation, analysis of the implementation structures efficiency, identification of programme's weaknesses in order to formulate recommendations to improve efficiency of the programme management</i>	<i>no indicator defined</i>	
<i>Training activities on structural funds management for the MA, IBs, beneficiaries of projects financed through SOP ENV</i>	<i>no indicator defined</i>	<b>Support for the management and evaluation of SOP ENV</b>
<i>Purchase of specific IT applications for SOP ENV</i>	<i>no indicator defined</i>	
<i>Remuneration of temporary staff to implement the above-mentioned responsibilities</i>	<i>no indicator defined</i>	
<i>Thematic studies related to the implementation of SOP ENV; thematic studies necessary to elaborate the environment strategy for the next programming period</i>	<i>no indicator defined</i>	
<i>Demonstration activities in order to apply modern solutions for integrated water management and innovative environmental technologies related to the KAIs of the SOP ENV</i>	<i>no indicator defined</i>	
<i>Support for establishment of platforms for the exchange of information and dissemination</i>	<i>no indicator defined</i>	
<i>Developing and implementing training/educational programs for staff adaptation to innovative technologies</i>	<i>no indicator defined</i>	
<i>Develop and implement the Communication Plan of SOP ENV</i>	<i>no indicator defined</i>	
<i>Consulting services for the elaboration of information materials, preparation of evaluation reports for SOP ENV</i>	<i>no indicator defined</i>	
<i>Information and publicity - organization of seminars, preparation of information materials, developing and updating the website of SOP ENV, distributing information materials and leaflets for the public, and for potential beneficiaries of projects financed through SOP ENV</i>	<ul style="list-style-type: none"> <li>(S) Population awareness level (%)</li> </ul>	<b>Support for information and publicity</b>



The following could be observed from analysing the link between objectives and indicators at the level of SOP Environment:

- on KAI 1.1, programme result indicator “*Regional water companies created*” was identified as remaining outside the objectives of the OP; one reason may be that, although SOP ENV envisages regionalisation of water companies, the existence of regional water operators is a precondition for projects’ approval (regional water operators are the sole eligible beneficiaries under the KAI 1.1) and not the objective of the intervention;
- no *output indicators* have been inappropriately assigned to the operational objectives;
- in respect to the third tier of the analysis “objectives that cannot be measured for lack of indicators” it could be observed that formally, there are no *impact indicators* established to assess the achievement of long – term, widespread effects SOP ENV, therefore the global objective of the programme is currently reflected in the system of indicators only indirectly, through output and result indicators. In addition, a number of operational and specific objectives can be only partially measured because of lack of either output or result indicators for the following interventions:
  - OUTPUT
    - construction/modernisation of water drinking sources (PA 1)
    - construction/rehabilitation of treatment facilities of the sludge generated in WWTP (PA 1)
    - metering, laboratory equipment, loss detection equipment, etc. (PA 1)
    - TA for project preparation, management and supervision, publicity, institutional governance improvement (PA 1)
    - purchase and installation of selective collection systems (PA 2)
    - recovering of the gas generated in landfills (PA 2)
    - construction of adequate facilities for municipal hazardous waste (medical, electric and electronic waste, etc.) and other specific waste categories (construction and demolition waste, etc.), including purchase and installation of equipment for municipal waste management facilities, and other specific categories of waste (PA 2)
    - TA for project preparation, management and supervision, publicity and public awareness campaigns(...), institutional governance improvement, tendering and contracting sanitation operators (PA 2)
    - TA for project preparation, option studies, management, supervision and publicity (PA 2)
    - introduction of improved metering system (PA 3)
    - TA for project preparation, management, works supervision and publicity for the project, including public awareness campaigns (PA 3)
    - support for the preparation / review of scientific studies, inventory, mapping (PA 4)
    - building and improving infrastructure of national protected areas (PA 4)
    - building information centres and information panels, risk management - fire prevention and control, etc. (PA 4)
    - development of measures designed to overcome barriers on rivers and highways (PA 4)

- purchase of land with significant value in terms of biodiversity in order to turn it into public property (PA 4)
- development of hazard maps and flood risk, plans and measures, including public information and education in risk reduction (PA 4)
- TA for project preparation, management, supervision and publicity (PA 5)
- preparing the necessary documents / strategies for projects identification and justification (PA 6)
- monitoring of the Programme and individual operations (PA 6)
- preparation of audit, controls and spot checks of projects financed through SOP ENV (PA 6)
- evaluation of SOP ENV, including continuous assessment (PA 6)
- purchase of specific IT applications for SOP ENV (PA 6)
- remuneration of temporary staff to implement the above-mentioned responsibilities (PA 6)
- demonstration activities in order to apply modern solutions for integrated water management and innovative environmental technologies related to the KAIs of the SOP ENV (PA 6)
- develop and implement the Communication Plan of SOP ENV (PA 6)
- preparation of evaluation reports for SOP ENV (PA 6)
- RESULTS
  - metering, laboratory equipment, loss detection equipment, etc. (PA 1)
  - TA for project preparation, management and supervision, publicity, institutional governance improvement (PA 1)
  - purchase and installation of selective collection systems (PA 2)
  - recovering of the gas generated in landfills (PA 2)
  - construction of adequate facilities for municipal hazardous waste (medical, electric and electronic waste, etc.) and other specific waste categories (construction and demolition waste, etc.), including purchase and installation of equipment for municipal waste management facilities, and other specific categories of waste (PA 2)
  - closure of non-compliant landfills, inclusively of the leachate collection system and biogas extraction system (PA 2)
  - TA for project preparation, management and supervision, publicity and public awareness campaigns(...), institutional governance improvement, tendering and contracting sanitation operators (PA 2)
  - restoration and cleaning of the land using appropriate measures for specific categories of contaminated sites (PA 2)
  - TA for project preparation, option studies, management, supervision and publicity (PA 2)
  - introduction of improved metering system (PA 3)
  - TA for project preparation, option studies elaboration, management, works supervision and publicity for the project, including public awareness campaigns (PA 3)





- training and strengthening the institutional capacity of management bodies of Natura 2000 sites and protected areas (PA 4)
- development of measures designed to overcome barriers on rivers and highways (PA 4)
- preparation of information materials and publicity and awareness for protected areas and Natura 2000 sites (PA 4)
- TA for project preparation, management and supervision, publicity, institutional governance improvement (PA 4)
- development of hazard maps and flood risk, plans and measures, including public information and education in risk reduction (PA 4)
- TA for project preparation, management, supervision and publicity (PA 4)
- development of hazard maps and flood risk, plans and measures, including public information and education in risk reduction (PA 5)
- TA for project preparation, management, supervision and publicity (PA 5)
- support for the Monitoring Committee meetings (PA 6)
- preparing the necessary documents / strategies for projects identification and justification (PA 6)
- preparation selection, evaluation and monitoring of the Programme and individual operations, including support for the IBs for such activities; using advisory services, where appropriate (PA 6)
- preparation of audit, controls and spot checks of projects financed through SOP ENV (PA 6)
- evaluation of SOP ENV, including continuous assessment (PA 6)
- elaboration of studies, analyses and reports focused on monitoring the impact of program implementation, analysis of the implementation structures efficiency, identification of programme's weaknesses in order to formulate recommendations to improve efficiency of the programme management (PA 6)
- training activities on structural funds management for the MA, IBs, beneficiaries of projects financed through SOP ENV (PA 6)
- purchase of specific IT applications for SOP ENV (PA 6)
- remuneration of temporary staff to implement the above-mentioned responsibilities (PA 6)
- thematic studies related to the implementation of SOP ENV; thematic studies necessary to elaborate the environment strategy for the next programming period (PA 6)
- demonstration activities in order to apply modern solutions for integrated water management and innovative environmental technologies related to the KAIs of the SOP ENV (PA 6)
- support for establishment of platforms for the exchange of information and dissemination (PA 6)
- developing and implementing training/educational programs for staff adaptation to innovative technologies (PA 6)



- develop and implement the Communication Plan of SOP ENV (PA 6)
- consulting services for the elaboration of information materials, preparation of evaluation reports for SOP ENV (PA 6)

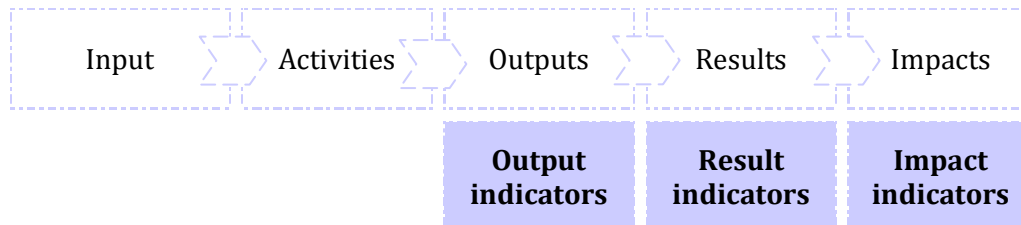
### ***Preliminary remarks***

The overall conclusion is that although objectives of SOP ENV are partially covered by existing output and result indicators, and there is room for enhancing their ability to capture the main interventions supported, by filling in the identified gaps.

### 2.1.3. INTERVENTION LOGIC

The “intervention logic” was built on the cause-effect relationship among inputs, activities, outputs, results and impacts. Thus, resources (*inputs*) are used to undertake the concrete interventions (*activities*) that will generate the *outputs*, which lead to the achievement of the direct and immediate effects of interventions (*results*) that contributes to longer-term and broader effects (*impact*).

The above described relationship provides the structure around which the measurement of performance by the use of indicators could be constructed. Different types of indicators correspond to each stage of the causal chain (see below figure).



The following tables show the causal link between the output and result indicators for each PA of SOP T in order to better understand whether there are indicators that fall outside the logical pattern. As in the SOP T impact indicators were not identified, the last causal relation (result indicators- impact indicators) is not treated.

For the purpose of current analysis the causal link between indicators is graphically illustrated in the tables below and it starts with the programme interventions (activities) which generate the effects without presenting the outputs and results that are measured.



**Fig. 6 intervention LOGIC SOP ENV** (P=programme, S=supplementary)

	<b>INTERVENTIONS</b>	<b>OUTPUT INDICATORS</b>	<b>RESULT INDICATORS</b>
<b>PA 1. Expanding and upgrading water and wastewater systems</b>	<i>Construction/modernisation of water drinking sources</i>	<i>no indicator defined</i>	<ul style="list-style-type: none"> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> </ul>
	<i>Construction/rehabilitation of drinking water treatment stations</i>	<ul style="list-style-type: none"> <li>(S) Treatment plants new and rehabilitated (no.)</li> </ul>	<ul style="list-style-type: none"> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> </ul>
	<i>Extension/rehabilitation of drinking water/sewage networks and corresponding civil structures, including rehabilitation of water pipes</i>	<ul style="list-style-type: none"> <li>(S) Length of water supply network - newly built (km)</li> <li>(S) Length of water supply network - rehabilitated (km)</li> <li>(S) Length of sewage network - newly built (km)</li> <li>(S) Length of sewage network - rehabilitated (km)</li> </ul>	<ul style="list-style-type: none"> <li>(P) Population connected to water services in a regional system (%)</li> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> <li>(S) Additional population connected to water supply services (no.)</li> <li>(S) Additional equivalent population connected to sewage services (no.)</li> </ul>
	<i>Construction/modernisation of waste water treatment plants (WWTP)</i>	<ul style="list-style-type: none"> <li>(P) Wastewater treatment plants new / rehabilitated (number)</li> <li>(S) Wastewater treatment plants new and rehabilitated (no.)</li> </ul>	<ul style="list-style-type: none"> <li>(P) Properly treated waste water (of the total waste water volume) - %</li> <li>(S) Population equivalent for which wastewater is treated according to NTPA 001 (no.)</li> </ul>
	<i>Construction/rehabilitation of treatment facilities for the sludge generated in WWTP</i>	<i>no indicator defined</i>	<ul style="list-style-type: none"> <li>(S) Localities benefiting from new and rehabilitated facilities (no.)</li> </ul>
	<i>Metering, laboratory equipment, loss detection equipment, etc.</i>	<i>no indicator defined</i>	<i>no indicator defined</i>
	<i>TA for project preparation, management and supervision, publicity, institutional governance improvement</i>	<i>no indicator defined</i>	<i>no indicator defined</i>



PA 2. Development of integrated waste management and waste management infrastructure expansion

INTERVENTIONS	OUTPUT INDICATORS	RESULT INDICATORS
<i>Purchase and installation of selective collection systems</i>	<i>no indicator defined</i>	<ul style="list-style-type: none"> <li>(P) Population benefiting from improved waste management systems (million inhabitants)</li> </ul>
<i>Construction, extension, rehabilitation or modernisation of municipal integrated waste management systems, such as sorting, transport, recycling, collecting, composting facilities, transfer, treatment and municipal waste disposal stations</i>	<ul style="list-style-type: none"> <li>(P) Number of new integrated waste management systems at county / regional level (number)</li> <li>(S) New waste management systems</li> <li>(S) Extended waste management systems (no.)</li> </ul>	<ul style="list-style-type: none"> <li>(P) Population benefiting from improved waste management systems (million inhabitants)</li> </ul>
<i>Recovering of gas generated in landfills</i>	<i>no indicator defined</i>	<i>no indicator defined</i>
<i>Construction of adequate facilities for municipal hazardous waste (medical, electric and electronic waste, etc.) and other specific waste categories (construction and demolition waste, etc.), including purchase and installation of equipment for municipal waste management facilities, and other specific categories of waste</i>	<i>no indicator defined</i>	<i>no indicator defined</i>
<i>Closure of non-compliant landfills, inclusively of the leachate collection system and biogas extraction system</i>	<ul style="list-style-type: none"> <li>(P) Old closed waste landfills in rural areas (small) - number</li> <li>(P) Old closed municipal waste landfills in urban areas (number)</li> <li>(S) Waste landfills (old non-compliant) in rural areas (small), closed (no.)</li> <li>(S) Municipal waste landfills (old) in urban areas, closed (no.)</li> </ul>	<i>no indicator defined</i>
<i>TA for project preparation, management and supervision, publicity and public awareness campaigns(...),institutional governance improvement, tendering and contracting sanitation operators</i>	<i>no indicator defined</i>	<i>no indicator defined</i>
<i>Restoration and cleaning of the land using appropriate measures for specific categories of contaminated sites;</i>	<ul style="list-style-type: none"> <li>P) Pilot projects for the rehabilitation of historically contaminated sites (no.)</li> <li>(S) Rehabilitated area - historically contaminated sites (ha)</li> </ul>	<i>no indicator defined</i>
<i>Technical assistance for project preparation, option studies, management, supervision and publicity</i>	<i>no indicator defined</i>	<i>no indicator defined</i>



PA 3. Pollution reduction and mitigation of climate change by restructuring and renovating urban heating systems to achieve energy efficiency targets in areas most affected by pollution

INTERVENTIONS	OUTPUT INDICATORS	RESULT INDICATORS
<p><i>Introduction of BAT (best available technologies) to reduce SO<sub>2</sub>, NO<sub>x</sub> and particulate matter</i></p>	<ul style="list-style-type: none"> <li>• (S) Projects for air quality improvement (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> <li>• (P) Reduction of SO<sub>2</sub> emissions from urban heating systems due to SOP interventions (tones)</li> <li>• P) Reduction of NO<sub>x</sub> emissions from urban heating systems due to SOP interventions (tones)</li> <li>• (S) Reduction of SO<sub>2</sub> emissions (t)</li> <li>• (S) Reduction of NO<sub>x</sub> emissions (t)</li> <li>• (S) Rehabilitated thermal capacity (MWh)</li> </ul>
<p><i>Rehabilitation of boilers and turbines</i></p>	<ul style="list-style-type: none"> <li>• (S) Projects for air quality improvement (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> </ul>
<p><i>Introduction of improved metering system</i></p>	<p><i>no indicator defined</i></p>	<p><i>no indicator defined</i></p>
<p><i>Rehabilitation of non-compliant slag and ash deposits</i></p>	<ul style="list-style-type: none"> <li>• (S) Projects for air quality improvement (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> </ul>
<p><i>Rehabilitation of hot water and heat distribution networks (including redesign of networks...)</i></p>	<ul style="list-style-type: none"> <li>• (P) Central heating systems rehabilitated (number)</li> <li>• S) Central heating systems rehabilitated (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Localities in which the air quality is improved due to rehabilitated heating systems (number)</li> <li>• S) Localities in which the air quality is improved (no.)</li> <li>• (S) Population benefiting from improved air quality (no.)</li> </ul>
<p><i>Technical assistance for project preparation, option studies elaboration, management, works supervision and publicity for the project, including public awareness campaigns</i></p>	<ul style="list-style-type: none"> <li>• (P) Options studies elaborated (number)</li> <li>• <i>no specific indicator defined for project preparation and management, works supervision, project publicity including public awareness campaigns</i></li> </ul>	<p><i>no indicator defined</i></p>



PA 4. Implementation of appropriate management systems for environmental protection

INTERVENTIONS	OUTPUT INDICATORS	RESULT INDICATORS
<p>Support for the preparation / review of management plans, scientific studies, inventory, mapping</p>	<ul style="list-style-type: none"> <li>• (P) Protected areas and Natura 2000 sites, with management plans in force / approved (number)</li> <li>• (S) Management plans elaborated/ revised (no.)</li> <li>• <i>no specific indicators for scientific studies, inventory, mapping</i></li> </ul>	<ul style="list-style-type: none"> <li>• (S) Management plans implemented (no.)</li> <li>• <i>no specific indicators for scientific studies, inventory, mapping</i></li> </ul>
<p>Training and strengthening the institutional capacity of management bodies of Natura 2000 sites and protected areas</p>	<ul style="list-style-type: none"> <li>• (S) Participant training days - beneficiaries, within nature conservation activities (no.)</li> <li>• (S) Participant training days - other structures within nature conservation activities (no.)</li> </ul>	<p><i>no indicator defined</i></p>
<p>Ecological restoration projects of habitats and species</p>	<ul style="list-style-type: none"> <li>• (S) Habitats ecologically rehabilitated (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Surface of protected areas and Natura 2000 sites, benefiting from nature conservation measures (% of total surface of protected areas)</li> <li>• (S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)</li> </ul>
<p>Building and improving infrastructure of national protected areas and Natura 2000 sites (building information centres and information panels, risk management - fire prevention and control, etc.);</p>	<ul style="list-style-type: none"> <li>• (S) Proposed sites in Natura 2000 network benefiting from measures implementation (no.)</li> <li>• <i>no specific indicator defined for interventions dedicated to the national protected areas</i></li> </ul>	<ul style="list-style-type: none"> <li>• (P) Surface of protected areas and Natura 2000 sites, benefiting from nature conservation measures (% of total surface of protected areas)</li> <li>• (S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)</li> </ul>
<p>Supporting biodiversity: reducing impact of infrastructure on the species affected by fragmentation of the landscape (development of measures designed to overcome barriers on rivers and highways)</p>	<p><i>no indicator defined</i></p>	<p><i>no indicator defined</i></p>
<p>Establish monitoring systems for Natura 2000 sites and protected areas, including infrastructure and equipment for monitoring the conservation status of natural habitats and of wild flora and fauna</p>	<ul style="list-style-type: none"> <li>• (S) Implemented/ extended IT systems within nature conservation activities (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Surface of protected areas and Natura 2000 sites, benefiting from nature conservation measures (% of total surface of protected areas)</li> <li>• (S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)</li> </ul>



*Preparation of information materials and publicity and awareness for protected areas and Natura 2000 sites*

- (S) Communication and promotional events within nature conservation activities (no.)
- (S) Information and publicity materials within nature conservation activities (no.)

*no indicator defined*



*Purchase of land with significant value in terms of biodiversity in order to turn it into public property*

*no indicator defined*

*no indicator defined*







PA 5. Implementation of adequate infrastructure for natural risk prevention in most vulnerable areas

INTERVENTIONS	OUTPUT INDICATORS	RESULT INDICATORS
<p><i>Infrastructure for flood prevention and reduction of the destructive consequences floods, including measures to enhance the morphology of the elements of water, construction and rehabilitation of retention polders, green fences, irrigation strips, deviation curves</i></p>	<ul style="list-style-type: none"> <li>• (P) Projects approved on floods protection (number)</li> <li>• (S) Protected area through protection works against floods risk (km<sup>2</sup>)</li> <li>• (S) Projects for natural risks prevention (no.)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Population benefiting from floods protection projects (no. inhabitants)</li> <li>• (P) Reducing the incidence to floods risk (%)</li> <li>• (S) Population benefiting from measures implementation - natural risks prevention (no.)</li> </ul>
<p><i>Development of hazard maps and flood risk, plans and measures, including public information and education in risk reduction</i></p>	<ul style="list-style-type: none"> <li>• (P) Projects approved on floods protection (number)</li> <li>• (S) Projects for natural risks prevention (no.)</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Reducing the incidence to floods risk (%)</li> <li>• (P) Population benefiting from floods protection projects (no. inhabitants)</li> <li>• (S) Population benefiting from measures implementation - natural risks prevention (no.)</li> </ul>
<p><i>Technical assistance for project preparation, management, supervision and publicity</i></p>	<p><i>no indicator defined</i></p>	<p><i>no indicator defined</i></p>
<p><i>Rehabilitation of the Black Sea coast area affected by erosion, including:</i></p> <ul style="list-style-type: none"> <li>- consolidation of existing works;</li> <li>- dismantling of existing works for their rehabilitation / extension</li> <li>- sanding and creating new beaches;</li> <li>- construction of dams and dikes for sand retention;</li> <li>- construction / rehabilitation of longitudinal submerged breakwaters for waves energy dissipation and reduction of sediment transport into the sea;</li> <li>- dams for water stabilization;</li> <li>- construction of access road;</li> <li>- sand transport facilities</li> </ul>	<ul style="list-style-type: none"> <li>▪ (P) Length of rehabilitated seashore (km)</li> <li>▪ (S) Length of rehabilitated seashore – natural risks prevention (km)</li> </ul>	<ul style="list-style-type: none"> <li>• (P) Extension of coast area (%)</li> <li>▪ (S) Extended coast area – natural risks prevention (km<sup>2</sup>)</li> </ul>
<p><i>Technical assistance for project preparation, management, supervision and publicity</i></p>	<p><i>no indicator defined</i></p>	<p><i>no indicator defined</i></p>



PA 6. Technical assistance

INTERVENTIONS <sup>3</sup>	OUTPUT INDICATORS	RESULT INDICATORS
Support for the Monitoring Committee meetings	<ul style="list-style-type: none"> <li>(P) Meetings of the Monitoring Committee organised (no./year)</li> <li>(S) Meetings of relevant committees and working groups (no.)</li> </ul>	<i>no indicator defined</i>
Preparing the necessary documents / strategies for projects identification and justification <sup>4</sup>	<i>no indicator defined</i>	<i>no indicator defined</i>
Preparation selection, evaluation and monitoring of the Programme and individual operations, including support for the IBs for such activities; using advisory services, where appropriate	<ul style="list-style-type: none"> <li>(P) Call for proposals supported by TA (no.)</li> <li>(P) Applications assessed with TA support (no.)</li> <li>(P) Evaluation reports elaborated (no.)</li> <li><i>no indicator defined for monitoring the programme and individual operations</i></li> </ul>	<i>no indicator defined</i>
Preparation of audit, controls and spot checks of projects financed through SOP ENV	<i>no indicator defined</i>	<i>no indicator defined</i>
Evaluation of SOP ENV, including continuous assessment	<i>no indicator defined</i>	<i>no indicator defined</i>
Elaboration of studies, analyses and reports focused on monitoring the impact of program implementation, analysis of the implementation structures efficiency, identification of programme's weaknesses in order to formulate recommendations to improve efficiency of the programme management	<ul style="list-style-type: none"> <li>(S) Studies, analyses, reports, strategies (no.)</li> <li>(S) Guidelines and other methodological documents (no.)</li> </ul>	<i>no indicator defined</i>
Training activities on structural funds management for the MA, IBs, beneficiaries of projects financed through SOP ENV	<ul style="list-style-type: none"> <li>(P) Staff trained (no./year)</li> <li>(S) Participant training days – composed (no.)</li> <li>(S) Participant training days – beneficiaries (no.)</li> <li>(S) Participant training days – managing structures (no.)</li> <li>(S) Participant training days – other structures (no.)</li> </ul>	<i>no indicator defined</i>
Purchase of specific IT applications for SOP ENV	<i>no indicator defined</i>	<i>no indicator defined</i>
Remuneration of temporary staff to implement the above-mentioned responsibilities	<i>no indicator defined</i>	<i>no indicator defined</i>
Thematic studies related to the implementation of SOP ENV; thematic studies necessary to elaborate the environment strategy	<ul style="list-style-type: none"> <li>(P) Thematic studies/strategies elaborated</li> </ul>	<i>no indicator defined</i>

<sup>3</sup> For manageability and balance reasons we'll recommend indicators only for the most prominent interventions, that can generate impact at programme level.

<sup>4</sup> this is a project-level activity; no indicator at programme level should be assigned



<i>for the next programming period</i>		
<i>Demonstration activities in order to apply modern solutions for integrated water management and innovative environmental technologies related to the KAls of the SOP ENV</i>	<i>no indicator defined</i>	<i>no indicator defined</i>
<i>Support for establishment of platforms for the exchange of information and dissemination</i>	<ul style="list-style-type: none"> <li>▪ Events focused on experience exchange related to funds implementation and thematic aspects (no.)</li> </ul>	<i>no indicator defined</i>
<i>Developing and implementing training/educational programs for staff adaptation to innovative technologies</i>	<ul style="list-style-type: none"> <li>▪ (P) Staff trained (no./year)</li> <li>▪ (S) Participant training days – composed (no.)</li> <li>▪ (S) Participant training days – beneficiaries (no.)</li> <li>▪ (S) Participant training days – managing structures (no.)</li> <li>▪ (S) Participant training days – other structures (no.)</li> </ul>	<i>no indicator defined</i>
<i>Develop and implement the Communication Plan of SOP ENV</i>	<i>no indicator defined</i>	<i>no indicator defined</i>
<i>Consulting services for the elaboration of information materials, preparation of evaluation reports for SOP ENV</i>	<ul style="list-style-type: none"> <li>▪ (S) Information and publicity materials(no.)</li> <li>▪ <i>no indicator defined for consulting services</i></li> </ul>	<i>no indicator defined</i>
<i>Information and publicity - organization of seminars, preparation of information materials, developing and updating the website of SOP ENV, distributing information materials and leaflets for the public, and for potential beneficiaries of projects financed through SOP ENV</i>	<ul style="list-style-type: none"> <li>▪ (P) Types of leaflets/brochures disseminated (number)</li> <li>▪ (P) Press conferences organised</li> <li>▪ (S) Information and publicity materials(no.)</li> <li>▪ (S) Mass-media campaigns (no.)</li> <li>▪ (S) Information requests received by the Information Centre (no.)</li> <li>▪ (S) Communication and promotion events (no.)</li> <li>▪ (S) Website visits (no.)</li> </ul>	<ul style="list-style-type: none"> <li>▪ (S) Population awareness level (%)</li> </ul>



The following preliminary conclusions could be drawn:

- generally, the system of indicators of SOP ENV follows the causal link between interventions, outputs and results indicators:
  - for example, in the case of KAI 1.1, the money allocated to investments through the contracted projects (inputs) generate immediate outputs in the form of physical infrastructure (length of water supply/sewage network) which in turn generates effects (results) of economic nature (increased public and private investment in areas with better infrastructure), social nature (improved accessibility, better services, reduced water consumption/capita), public health nature (decrease in the number of diseases stemming from the consumption of water coming from uncontrolled sources) etc.
  - one output indicator (*e.g. Projects for air quality improvement*), may lead to more than a single result indicator (*Localities in which the air quality is improved due to rehabilitated heating systems, Population benefiting from improved air quality, Reduction of SO2 emissions, reduction of NOx emissions*)
- there are a number of programme interventions (activities) whose outputs cannot be measured due to the lack of “*output indicators*”, as indicated in the current section, as well as in section 2.1.2, consequently limiting the measurement of result indicators;
- the output indicators related to the PA 6 Technical Assistance, Kai 6.1 are not sequenced by any result indicators, therefore, the direct and immediate effects of the projects developed under this area of intervention cannot be assessed;
- there are a number of programme interventions (activities) whose result cannot be measured due to the lack of “*result indicators*”, as already detailed in the current and previous sections.
- following the revision process of SOP ENV indicators conducted in 2008-2009<sup>5</sup>, a series of initial programme indicators were modified and introduced in the Framework Document for Implementation as supplementary indicators. This led to the situation to have two indicators which are measuring the same output/result.

As a general conclusion, the system of indicators at the level of SOP ENV follows the logical pattern explained in the beginning of this section, except for a number of gaps that were identified and previously presented.

#### 2.1.3.1 Effects on environment

Through its interventions, the SOP Environment causes a series of outputs, results and impacts. The cause-effect relationship among these outputs, results and impact of the programme could be expressed through a series of **thematic areas**<sup>6</sup>:

- a) Infrastructure: improved /extended physical infrastructure, reflected in indicators both as a direct output of the interventions and as results, such as fulfilling the commitments made in the negotiation process by Romania, e.g. to comply with the Directive No 91/271/EC on urban wastewater treatment by the end of 2018;
- b) Economic: improved economic activity, reflected as result of investments in infrastructure (especially water and waste infrastructure, but also contaminated sites rehabilitation);

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<sup>5</sup> Between 2008 -2009 was conducted a consultation process between SOP ENV MA and ACIS with the purpose to standardize information and carrying out a system that allows the organizing and comparing data, as well as bottom-up aggregation at different levels of OP and NSRF.

<sup>6</sup> Based on EC External Services Evaluation Unit – Outcome and impact level indicators – water and sanitation, Working paper April 2009



- c) Social: improved access to clean water and better air quality, reflected as result of investments in environment infrastructure;
- d) Public health: reflected as results of investments made in environment infrastructure;
- e) Environment: reflected as direct outputs (such as specific works for environment protection and improving environmental conditions) and as results (such as better air quality, better access to water and waste systems).
- f) Administrative capacity: reflected as direct outputs, such as management plans approved, training, etc. and as results of the interventions such as management plans implemented.
- g) Awareness: reflected as direct outputs of the interventions such as promotion/awareness events, information materials, etc.

The SOP Environment, by its nature, has/should have, in the first place, environmental effects, further than other, e.g. economic effects. The graphics below present the effects SOP Environment has, including on environment as such.

INPUTS - financial allocation - no of contracted projects			
	OUTPUTS	RESULTS	THEMATIC AREAS
<b>Priority Axis 1 - Extension and modernisation of water and waste water systems</b>			
<b>KAI 1.1. Extension/ modernisation of water and waste water systems</b>	<b>Infrastructure</b> - (P) Localities provided with new/rehabilitated water facilities in a regional management system - (P) New/Rehabilitated WWTP - (S) WWTP new and rehabilitated - (S) Treatment Plants new and rehabilitated (no.) - (S) Length of water supply network - newly built - (S) Length of water supply network - rehabilitated - (S) Length of sewage network - newly built - (S) Length of water supply network - rehabilitated	(P) Regional water companies created (S) Localities provided with new and rehabilitated facilities	Infrastructure Economic
		- (P) Population connected to water services in a regional management system - (P) Waste water treated (of the total wastewater volume) - (S) Equivalent population for which waste water is treated according to NTPA 001 - (S) Additional population connected to water supply services - (S) Additional equivalent population connected to sewage services	Public health Economic Social
		<b>Environment</b> - Increased waste water treatment - Reduced water consumption per capita - WWTP performance (noncompliant /compliant) - Reduced water leakages in the water distribution network	Environment Public health Social

INPUTS - financial allocation - no of contracted projects			
	OUTPUTS	RESULTS	THEMATIC AREAS
<b>Priority Axis 2 - Development of integrated waste management systems and rehabilitation of historically contaminated sites</b>			
<b>KAI 2.1. Development of integrated waste management systems and extension of waste management infrastructure</b>	<b>Infrastructure</b> - (P) Number of new integrated waste management systems at county/regional level - (P) Old waste landfills and dumps closed in rural areas (small) - (P) Old municipal waste landfills closed in urban areas - (S) New waste management systems - (S) Extended waste management systems - (S) Waste landfills (old, noncompliant) in rural areas (small), closed - (S) Municipal waste landfills (old) in urban areas, closed - (S) Population benefiting from implementation of measures - waste management (no.)	(P) Population benefiting from improved waste management systems	Social Public health
		<b>Environment</b> - Area cleaned of waste - Recycled waste quantity - Separated waste quantity - Quantity of waste recovered to be reused	Environment Public health Economic
<b>KAI 2.2. Rehabilitation of historically contaminated sites</b>	<b>Infrastructure</b> - (P) Pilot projects for rehabilitation of historically contaminated sites - (S) Rehabilitated area - historically contaminated sites	<b>- No indicator to measure the results</b>	Infrastructure Economic
		<b>Environment</b> - Rehabilitated area	Environment Economic



INPUTS			
- financial allocation			
- no of contracted projects			
OUTPUTS	RESULTS	THEMATIC AREAS	
<b>Priority Axis 3 – Reduction of pollution and mitigation of climate change by restructuring and renovating urban heating systems towards energy efficiency targets in the identified local environmental hotspots</b>			
<b>KAI 3.1. Rehabilitation of urban heating systems in hotspots</b>	<b>Infrastructure</b> - (P) Rehabilitated urban heating systems - (S) Rehabilitated central heating systems - (S) Projects for air quality improvement	- (P) Population benefitting from improved air quality	<b>Public health</b>
	<b>Technical capacity</b> - (P) Option studies elaborated	- (P) Localities in which the air quality is improved due to rehabilitated urban heating systems - (S) Localities in which the air quality is improved - (S) Rehabilitated thermal capacity	<b>Environment</b> <b>Public health</b> <b>Economic</b> <b>Social</b>
		- (P) Reduction of SO2 emissions, from urban heating plants due to SOP interventions - (P) Reduction of NOx emissions, from urban heating plants due to SOP interventions - (S) Reduction of SO2 emissions - (S) Reduction of NOx emissions	<b>Environment</b> <b>Public health</b> <b>Social</b>
		<b>Environment</b> Increase of energy efficiency in heating systems Reduction of atmospheric emissions	<b>Environment</b> <b>Public health</b> <b>Social</b>

INPUTS - financial allocation - no of contracted projects			
	OUTPUTS	RESULTS	THEMATIC AREAS
<b>Priority Axis 4 – Implementation of Adequate Management Systems for Nature Protection</b>			
<b>KAI 4.1. Development of infrastructure and management plans to protect biodiversity and Natura 2000</b>	<b>Environment</b> - (S) Proposed sites in Natura 2000 network benefiting from measures implementation - (S) Habitats ecologically rehabilitated	- (P) Surface of protected areas and Natura 2000 sites benefiting from nature conservation measures - (S) Surface of protected areas and Natura 2000 sites benefiting from measures implementation	Environment Economic
	<b>Public awareness</b> - (S) Communication and promotion events within activities for nature conservation - (S) Information and publicity materials within nature conservation activities - (S) Implemented/extended IT systems within nature conservation activities	- No indicator to measure the results	Environment Awareness Administrative capacity
	<b>Administrative capacity</b> - (P) Protected areas and Natura 2000 sites, with management plans in force/approved - (S) participant training days – beneficiaries, within nature conservation activities - (S) participant training days – other structures, within nature conservation activities - (S) Elaborated/ revised management plans	- (S) Implemented management plans	Environment Administrative capacity
		<b>Environment</b> - Surface of natural protected areas benefiting from conservation measures	Environment



INPUTS			
- financial allocation			
- no of contracted projects			
OUTPUTS	RESULTS	THEMATIC AREAS	
<b>Priority Axis 5 – Implementation of adequate infrastructure of natural risk prevention in most vulnerable areas</b>			
<b>KAI 5.1. Protection against floods</b>	<b>Infrastructure</b> - (P) Projects approved on floods protection - (S) Protected area through protection works against floods risk - (S) Projects on natural risks prevention	- (P) Population benefiting from floods protection measures (P) Reduction of incidence to flood risk - (S) Population benefiting from measures implementation – natural risks prevention	→ <b>Social</b> → <b>Economic</b>
		<b>Environment</b> Projects contributing to protection against natural disasters	→ <b>Environment</b>
<b>KAI 5.2. Reduction of coastal erosion</b>	<b>Infrastructure</b> - (P) Length of rehabilitated seashore - (S) Length of rehabilitated seashore - natural risks prevention	- (P) Extension of coastal area - (S) Extended coastal area – natural risks prevention	→ <b>Environment</b> → <b>Economic</b>

INPUTS - financial allocation - no of contracted projects			
	OUTPUTS	RESULTS	THEMATIC AREAS
<b>Priority Axis 6 – Technical assistance</b>			
<b>KAI 6.1. Support for SOP ENV management and evaluation</b>	<b>Administrative capacity</b> <ul style="list-style-type: none"> <li>- (P) Meetings of the Monitoring Committee organised</li> <li>- (P) Call for proposals supported by TA</li> <li>- (P) Staff trained</li> <li>- (P) Applications assessed with TA support</li> <li>- (P) Evaluation reports elaborated</li> <li>- (P) Thematic studies/strategies elaborated</li> <li>- (S) Meetings of relevant committees and working groups</li> <li>- (S) Participant training days – composed</li> <li>- (S) Participant training days – beneficiaries</li> <li>- (S) Participant training days – management structures</li> <li>- (S) Participant training days – other structures</li> <li>- (S) Studies, analyses, reports, strategies</li> <li>- (S) Guidelines and other methodological documents</li> <li>- Events focused on experience exchange related to funds implementation and thematic issues</li> </ul>	- No indicator to measure the results	Administrative capacity
<b>KAI 6.2. Support for information and publicity</b>	<ul style="list-style-type: none"> <li>- (P) Types of leaflets/brochures disseminated</li> <li>- (P) Press conferences organised</li> <li>- (S) Information and publicity materials</li> <li>- (S) Mass-media campaigns</li> <li>- (S) Information requests received by the Information centre</li> <li>- (S) Communication and promotion events</li> <li>- (S) Website visits</li> </ul>	- (S) Population awareness level	Awareness

As presented above, and as expected for the SOP Environment, one **area** of significant impact of investments carried out under this OP is the “**environment**”.

In accordance with the provisions of the European and national environmental legislation, the SOP ENV was subject of a Strategic Environment Assessment (SEA) which analysed the potential effects of the SOP ENV interventions on environment.

SEA addresses the issue of environmental effects at the “ex-ante” moment, before the actual implementation of the programme was initiated and it was carried out with precisely this purpose: to identify, mitigate and even annul from the outset the possible significant effects, especially negative, of the OP on environment.

Furthermore, in accordance with the European and national legislation in place, environmental monitoring should be carried out during programme implementation, and after their completion. For this purpose, the SEA reports proposed **environmental indicators**, to be incorporated into the overall system of monitoring of the OP, which could be used selectively based on the characteristics of the projects selected for funding.



The environmental indicators are instruments which evaluate the positive or negative state of the environment and the consequences of applied measures.

The general systematic stages completed in the analysis of environmental indicators, for the SOP Environment, were as follows:

- to identify the effects of interventions, based on the findings of the SEA Report for each area of intervention under SOP ENV;
- to identify the environmental aspects affected, based on the SEA Report. For an ease reference these aspects were grouped into six main categories<sup>7</sup>;
- to establish a correlation among different indicators proposed in SEA and the environmental aspects affected;
- to correlate the SEA proposed indicators with the ones considered for further environmental monitoring by the MA SOP ENV.

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<sup>7</sup> 1. AMBIENT and AIR QUALITY; 2. CLIMATE CHANGE; 3. WATER and SOIL; 4. BIODIVERSITY, LANDSCAPE and CULTURAL HERIRAGE; 5. POPULATION and HUMAN HEALTH; 6. RESOURCES and ENERGY EFFICIENCY



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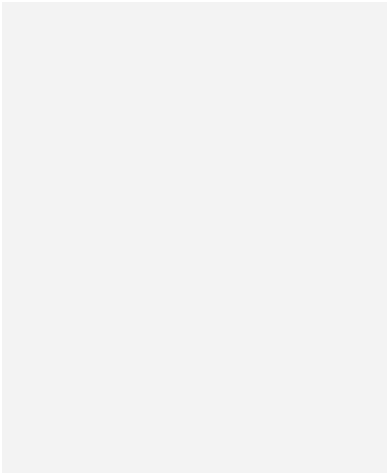
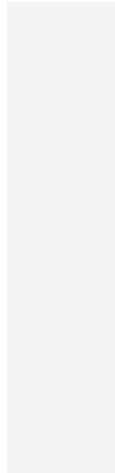
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WATER SUPPLY AND WASTEWATER SYSTEMS

AREAS OF INTERVENTION	EFFECTS of INTERVENTIONS	ENVIRONMENTAL ASPECTS	SEA PROPOSED ENVIRONMENTAL INDICATORS	OP ENVIRONMENTAL INDICATORS
<ul style="list-style-type: none"> <li>▪ construction/modernization of water sources intended for drinking water abstraction;</li> <li>▪ construction/rehabilitation of water treatment plants;</li> <li>▪ extension/rehabilitation of water and sewerage networks</li> <li>▪ construction/upgrading of wastewater treatment plants (including the introduction of tertiary treatment step)</li> <li>▪ construction/rehabilitation of sludge treatment facilities;</li> </ul>	<p>(+) construction/rehabilitation of sludge treatment facilities will limit the GHG emissions</p>	<p><b>CLIMATE CHANGE</b></p>	<ul style="list-style-type: none"> <li>• Reduction/increase in GHG emissions (CO2 equivalent)</li> </ul>	
	<p>(+/-) rehabilitation of sewerage networks, improvement of technical parameters of the wastewater treatment plants and sludge treatment facilities will cut down the leakages, therefore will lead to reduction of soil pollution.</p> <p>(+) extension of sewerage network and the construction of wastewater treatment plants and sludge treatment facilities will limit the water and soil pollution from point sources</p>	<p><b>WATER and SOIL</b></p>	<ul style="list-style-type: none"> <li>• Increase in waste water treated (% change and m3);</li> <li>• Reduction in water consumption per person (from the population served)</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in waste water treated (% change and m3);</li> <li>• Reduction in water consumption per person (from the population served) (m<sup>3</sup>)</li> <li>• Performance of wastewater treatment plants (properly functioning / improperly functioning)</li> <li>• Reduced losses of water in the distribution network as % of total water production.</li> </ul>
	<p>(+/-) extension and construction of water and wastewater systems may affect the locations close to protected areas and Natura 2000 sites.</p> <p>(+) the construction/ extension/ upgrading of water and wastewater systems will reduce the pollution of water and soil, therefore the negative effects on aquatic and terrestrial ecosystems are minimised</p>	<p><b>BIODIVERSITY, LANDSCAPE and CULTURAL HERIRAGE</b></p>	<ul style="list-style-type: none"> <li>• Area of protected areas and potential Natura 2000 sites affected (ha)</li> </ul>	
	<p>(+) the construction/ extension/ upgrading of water systems will contribute to the</p>	<p><b>POPULATION and HUMAN HEALTH</b></p>	<ul style="list-style-type: none"> <li>• Connection rate of population to sanitary services (urban and</li> </ul>	

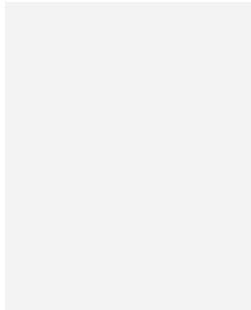


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better drinking water quality, therefore will lead to a positive impact on the human health  
(+) the construction/ extension/ upgrading of wastewaters systems and sludge treatment facilities implies the reduction of pollution discharges, therefore the negative impact on human health is minimised

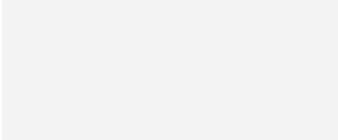
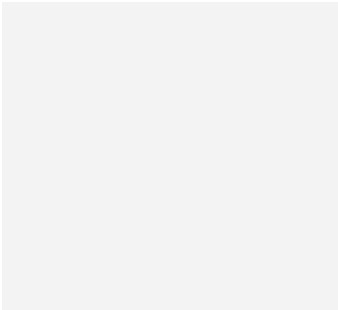
(+) construction/modernization of water sources intended for drinking water abstraction and the rehabilitation of water networks will lead to a better management of water resources



**RESOURCES and ENERGY EFFICIENCY**

- rural, %)
- General and specific morbidity and mortality for the exposed population
- Number of projects dealing with environmentally responsible behaviour (e.g. awareness raising campaigns)
- Number of people reached (affected) by the project

- 



AREAS OF INTERVENTION	EFFECTS of INTERVENTIONS	ENVIRONMENTAL ASPECTS	SEA PROPOSED ENVIRONMENTAL INIDCATORS	OP ENVIRONMENTAL INDICATORS
<b>WASTE MANAGEMENT</b> <ul style="list-style-type: none"> <li>▪ <i>construction, extension, rehabilitation or modernization of municipal waste management systems,</i></li> <li>▪ <i>recovery of gas from landfills, where appropriate</i></li> <li>▪ <i>construction of facilities for municipal hazardous waste and other specific municipal waste streams.</i></li> <li>▪ <i>closure of non-compliant landfills</i></li> <li>▪ <i>land restoration and cleaning of contaminated sites;</i></li> <li>▪ <i>acquisition and installation of selective collection systems</i></li> </ul>	<p>(+) development of waste management systems and closure of non-compliant landfills will reduce the gas emissions from waste (comprising of methane and odorous compounds) and dust, therefore the ambient and air quality in the surrounding areas will be improved</p>	<p><b>AMBIENT and AIR QUALITY</b></p>		
	<p>(+) the implementation of gas recovery facilities from landfills will reduce the quantity of GHG emissions.</p>	<p><b>CLIMATE CHANGE</b></p>	<ul style="list-style-type: none"> <li>• Reduction/increase in GHG emissions (CO2 equivalent)</li> </ul>	
	<p>(+) development of waste management systems and closure of non-compliant landfills will reduce the gas emissions, therefore the greenhouse gas emissions will be minimized</p>	<p><b>WATER and SOIL</b></p>	<ul style="list-style-type: none"> <li>• Area of land cleaned from waste</li> </ul>	<ul style="list-style-type: none"> <li>• Waste land area cleared (ha / km <sup>2</sup>)</li> </ul>
	<p>(+) development of waste management systems and closure of non-compliant landfills will reduce the emissions from waste, therefore the water pollution in the surroundings of the landfills will be minimised and the water protection in the locations of the new ones will be ensured, especially with regards to underground water.</p> <p>(+) development of waste management systems and closure of non-compliant landfills will reduce the emissions from waste, therefore the soil pollution in the surroundings of the landfills will be minimised.</p>	<p><b>BIODIVERSITY, LANDSCAPE and</b></p>	<ul style="list-style-type: none"> <li>• Area of protected areas and potential Natura 2000 sites</li> </ul>	
<p>(+) implementation of integrated waste management systems and reduction of</p>				

		<p>uncontrolled landfills will reduce the emissions from waste, therefore impact on the flora and fauna of the local area will be minimised</p> <p>(+) construction of adequate facilities will ensure protection of natural and cultural landscape</p>	<p><b>CULTURAL HERIRAGE</b></p>	<p>affected (ha)</p>	
		<p>(+) recycling and reuse of waste will contribute to the reduction in the use of natural resources.</p>	<p><b>WASTE RESOURCES and ENERGY EFFICIENCY</b></p>	<ul style="list-style-type: none"> <li>• Waste recycled (tons)</li> <li>• Waste separated (tons)</li> <li>• Waste recovered for further use (tons)</li> </ul>	<ul style="list-style-type: none"> <li>• Amount of waste recycled (tonnes)</li> <li>• The amount of separated waste (tonnes)</li> <li>• Amount of waste recovered for reuse (tonnes)</li> <li>• Percentage of population connected to sanitation services (%)</li> <li>• The volume of solid waste deposited in landfill;</li> </ul>
		<p>(+) development of waste management systems and closure of non-compliant landfills will reduce the emissions from waste, therefore the odorous annoyance and health impacts among the surrounding populations will be minimised cause</p> <p>(+) establishing waste selective collection, sorting and recycling systems will contribute to environmental responsible behaviour.</p>	<p><b>POPULATION and HUMAN HEALTH</b></p>	<ul style="list-style-type: none"> <li>• General and specific morbidity and mortality for the exposed population</li> <li>• Number of projects dealing with environmentally responsible behaviour (e.g. awareness raising campaigns)</li> <li>• Number of people reached (affected) by the project</li> </ul>	

AREAS OF INTERVENTION	EFFECTS of INTERVENTIONS	ENVIRONMENTAL ASPECTS	SEA PROPOSED ENVIRONMENTAL INDICATORS	OP ENVIRONMENTAL INDICATORS
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>CONTAMINATED SITES</b></p> <ul style="list-style-type: none"> <li>Land restoration and cleaning of contaminated sites;</li> </ul>	<p>(+) land restoration and cleaning will reduce the exposure of environment to emissions of air pollutants and GHG</p>	<p><b>CLIMATE CHANGE</b></p>	<ul style="list-style-type: none"> <li>Reduction/increase in GHG emissions (CO2 equivalent)</li> </ul>	
	<p>(+) rehabilitation of old ecological burdens will reduce the emissions from waste, therefore, therefore will ensure limitation in water pollution and improve quality of underground water.</p> <p>(+) rehabilitation of old ecological burdens will reduce the emissions from waste, therefore, therefore will limit the soil pollution.</p>	<p><b>WATER and SOIL</b></p>		
	<p>(+) rehabilitation of old ecological burdens will reduce the emissions from waste, therefore will minimise the adverse effects on terrestrial and aquatic eco-systems</p> <p>(+) land restoration and cleaning of contaminated sites will ensure protection of natural and cultural landscape</p>	<p><b>BIODIVERSITY, LANDSCAPE and CULTURAL HERIRAGE</b></p>	<ul style="list-style-type: none"> <li>Area of old ecological burdens cleaned, revitalized or recovered for reuse (ha)</li> </ul>	<p>Area rehabilitated (ha)</p>
	<p>(+) the extracted materials located in old ecological burdens can be reused/ recycled, e.g utilisation in construction</p>	<p><b>RESOURCES and ENERGY EFFICIENCY</b></p>	<ul style="list-style-type: none"> <li>Waste recycled (tons)</li> <li>Waste recovered for further use (tons)</li> </ul>	
	<p>(+) rehabilitation of historically contaminated sites will lead to better quality of the environment due to cleaning up of old burdens, therefore will ensure an</p>	<p><b>POPULATION and HUMAN HEALTH</b></p>	<ul style="list-style-type: none"> <li>General and specific morbidity and mortality for the exposed population</li> <li>Number of people reached</li> </ul>	



improvement in human health;

(affected) by the project

	<b>AREAS OF INTERVENTION</b>	<b>EFFECTS of INTERVENTIONS</b>		<b>ENVIRONMENTAL ASPECTS</b>	<b>SEA PROPOSED ENVIRONMENTAL INDICATORS</b>	<b>OP ENVIRONMENTAL INDICATORS</b>
<b>HEATING SYSTEMS</b>	<ul style="list-style-type: none"> <li>▪ <i>Introduction of BAT (best available techniques) for SO2, NOx and dust reduction (de-SO2, de-NOx and reduction of dust emissions);</i></li> <li>▪ <i>Rehabilitation of boilers and turbines;</i></li> <li>▪ <i>Introduction of improved metering</i></li> <li>▪ <i>Rehabilitation of non-compliant slag and ash landfills</i></li> <li>▪ <i>Rehabilitation of heat distribution networks</i></li> </ul>	(+) rehabilitation of municipal heating systems by rehabilitating boilers and turbines and introducing BAT will reduce the emissions of SO2, NOx and dust therefore will contribute to the improvement of ambient and air quality.	⇒	<b>AMBIENT and AIR QUALITY</b>	Atmospheric emissions of: <ul style="list-style-type: none"> <li>• NOx;</li> <li>• SO2</li> <li>• VOCs Volatile organic compounds;</li> <li>• PM10</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce emissions:               <ul style="list-style-type: none"> <li>• NOx,</li> <li>• SO2</li> <li>• VOC</li> <li>• PM10 (%).</li> </ul> </li> </ul>
		(+) rehabilitation of municipal heating will reduce the gas emissions; therefore GHG emissions are minimised.	⇒	<b>CLIMATE CHANGE</b>	<ul style="list-style-type: none"> <li>• Reduction/increase in GHG emissions (CO2 equivalent)</li> </ul>	
		(+) rehabilitation of non-compliant slag and ash landfills will reduce the acidification and land contamination from heavy metals and other particles, therefore will lead to the reduction of point and diffused pollution of soil.	⇒	<b>WATER and SOIL</b>		
		(+) rehabilitation of non-compliant slag and ash landfills will contribute to protection of cultural landscape		<b>BIODIVERSITY, LANDSCAPE and CULTURAL HERIRAGE</b>		
		(+) rehabilitation of urban heating systems will lead to better air quality and consequently, to improved living conditions for population and human health in the areas affected by the projects.	⇒	<b>POPULATION and HUMAN HEALTH</b>	<ul style="list-style-type: none"> <li>• General and specific morbidity and mortality for the exposed population</li> <li>• Number of projects dealing with environmentally responsible behaviour (e.g. awareness raising campaigns)</li> <li>• Number of people reached (affected) by the project</li> </ul>	
		(+) rehabilitation and heating distribution networks will contribute to better control on	⇒	<b>RESOURCES and ENERGY</b>	<ul style="list-style-type: none"> <li>• Increase in energy efficiency in supported heating</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing energy efficiency in heating</li> </ul>

energy consumption, therefore will improve the energy efficiency. Another effect of the rehabilitation of heating systems is related to the introduction of metering, which will improve the energy efficiency.

**EFFICIENCY**

systems (%)

systems (%)

	<b>AREAS OF INTERVENTION</b>	<b>EFFECTS of INTERVENTIONS</b>	<b>ENVIRONMENTAL ASPECTS</b>	<b>SEA PROPOSED ENVIRONMENTAL INDICATORS</b>	<b>OP ENVIRONMENTAL INDICATORS</b>
<b>NATURE PROTECTION</b>	<ul style="list-style-type: none"> <li>▪ <i>development of management plans, scientific studies, inventories, mapping</i></li> <li>▪ <i>institutional capacity building of the Natura 2000 sites and protected areas management bodies;</i></li> <li>▪ <i>Ecological restoration of habitats and the reinforcement of species population</i></li> <li>▪ <i>2000 sites (building of visitors' and informational centres and information panels, risk management – fire prevention and control, etc.)</i></li> <li>▪ <i>Biodiversity support: reducing impact of infrastructure improvements on species affected by fragmentation of landscape (realisation of measures designed to overcome barriers on rivers and motorways)</i></li> <li>▪ <i>Setting up of the monitoring systems for the Natura 2000 sites and protected areas, including infrastructure and equipment for monitoring of the natural habitats and flora and fauna species conservation status</i> <ul style="list-style-type: none"> <li>▪ <i>Preparation of information and publicity materials, awareness raising for the protected areas and Natura 2000;</i></li> <li>▪ <i>Acquisition of high biodiversity value land in order to become state public property.</i></li> </ul> </li> </ul>	<p>(+) improving the infrastructure and management system of the protected areas and Natura 2000 management bodies will lead to protection of eco-systems and natural diversity of designed areas (protected areas and nature 2000).</p> <p>(+) development of infrastructure and management plans to protect biodiversity and Natura 2000 will ensure protection of natural landscape.</p>	<p>⇒</p> <p><b>BIODIVERSITY, LANDSCAPE and CULTURAL HERIRAGE</b></p>	<ul style="list-style-type: none"> <li>• Surface of protected areas, including Natura 2000 sites benefiting from nature conservation measures</li> <li>• Number of projects contributing to protection against natural and industrial disasters</li> </ul>	<ul style="list-style-type: none"> <li>• The area of protected natural areas that benefit from conservation measures (% of the protected areas in Romania and in hectares)</li> </ul>
			<p>⇒</p> <p><b>POPULATION and HEALTH</b></p>		

	<b>AREAS OF INTERVENTION</b>	<b>EFFECTS of INTERVENTIONS</b>		<b>ENVIRONMENTAL ASPECTS</b>	<b>SEA PROPOSED ENVIRONMENTAL INDICATORS</b>	<b>OP ENVIRONMENTAL INDICATORS</b>
<b>NATURAL RISK PREVENTION</b>	<ul style="list-style-type: none"> <li>• <i>infrastructure for flood prevention and reduction of the destructive consequences of floods</i></li> </ul>	(+) rehabilitation of sea shore will contribute to reduction of costal erosion, therefore will facilitate the soil protection	⇒	<b>WATER and SOIL</b>		
	<ul style="list-style-type: none"> <li>▪ <i>development of hazard and flood risk prevention maps, plans and measures, including public information and training in reducing risks</i></li> <li>▪ <i>rehabilitation of Black Sea shore affected by erosion</i></li> </ul>	<p>(-) constructions for flood protection will affect the terrestrial and aquatic eco-systems, and the natural landscape</p> <p>(+) rehabilitation of sea shore will contribute in maintaining the maritime ecosystem and protection of cultural heritage</p>	⇒	<b>BIODIVERSITY, LANDSCAPE and CULTURAL HERIRAGE</b>	<ul style="list-style-type: none"> <li>• Area of protected areas and potential Natura 2000 sites affected (ha)</li> <li>• Number of projects contributing to protection against natural and industrial disasters</li> </ul>	<ul style="list-style-type: none"> <li>• Projects contributing to protection against natural and industrial disasters (no.)</li> </ul>
		<p>(+) construction works for flood prevention and the measures taken for protection against floods will increase population protection from risks associated.</p> <p>(+) rehabilitation of sea shore will contribute to reduction of costal erosion, therefore will be increased the population protection from risks associated</p>	⇒	<b>POPULATION and HUMAN HEALTH</b>	<ul style="list-style-type: none"> <li>• General and specific morbidity and mortality for the exposed population</li> <li>• Number of people reached (affected) by the project</li> </ul>	

## ENVIRONMENT IMPACT INDICATORS

1.	NOx emissions (kt)
2.	SO2 emissions (kt)
3.	Volatile Organic Compounds -VOCs emissions (kt)
4.	Particulate Matters - PM10 emissions (kt)
5.	GHG emissions: CO2 equivalent (kt)
6.	Increase in waste water treated (m3 and % change);
7.	Reduction in water consumption per person due to financed interventions (m3 and % change);
8.	Increase in connection rate of population to sanitary services due to financed interventions (%)
9.	Contaminated sites rehabilitated (ha) <b>a)</b>
10.	Waste collected due to financed interventions (% from waste generated)
11.	Waste recycled due to financed interventions (% from waste collected)
12.	Increase in energy efficiency in supported heating systems (%)
13.	Area of land protected against erosion (ha) <b>b)</b>
14.	Designated areas affected (ha) *
15.	Designated areas benefiting from nature conservation measures (ha) *
16.	Number of projects contributing to protection against natural disasters
17.	Number of people benefiting from flood protection measures ( <b>core indicator</b> )
18.	Number of projects stimulating an environmentally responsible behaviour

a) contaminated sites = overarching typology for both surfaces cleaned under KAI 2.1 and 2.2.  
 b) indicator corresponding to a gap identified in the table above (empty space)  
 \* designated areas: Natura 2000, archaeological and cultural areas

PA	KAI	PROPOSED INDICATORS
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PA1	KAI 1.1: Extension/modernization of water and wastewater systems	<ol style="list-style-type: none"> <li>1. GHG emissions: CO2 equivalent (kt)</li> <li>2. Increase in waste water treated (m3 and % change);</li> <li>3. Reduction in water consumption per person due to financed interventions (m3 and % change);</li> <li>4. Increase in connection rate of population to sanitary services due to financed interventions (%)</li> <li>5. Designated areas affected (ha) *</li> <li>6. Number of projects stimulating an environmentally responsible behaviour</li> </ol>
PA 2	KAI 2.1 Development of integrated waste management systems and extension of waste management infrastructure	<ol style="list-style-type: none"> <li>1. GHG emissions: CO2 equivalent (kt)</li> <li>2. Contaminated sites rehabilitated (ha) a)</li> <li>3. Waste collected due to financed interventions (% from waste generated)</li> <li>4. Waste recycled due to financed interventions (% from waste collected)</li> <li>5. Designated areas affected (ha) *</li> <li>6. Number of projects stimulating an environmentally responsible behaviour</li> </ol>
	KAI 2.2 Rehabilitation of historically contaminated sites	<ol style="list-style-type: none"> <li>1. Contaminated sites rehabilitated (ha) a)</li> <li>2. Waste collected due to financed interventions (% from waste generated)</li> <li>3. Waste recycled due to financed interventions (% from waste collected)</li> <li>4. Designated areas affected (ha) *</li> <li>5. Number of projects stimulating an environmentally responsible behaviour</li> </ol>

PA 3	KAI 3.1. Rehabilitation of urban heating systems in selected priority areas	<ol style="list-style-type: none"> <li>1. NOx emissions (kt)</li> <li>2. SO2 emissions (kt)</li> <li>3. Volatile Organic Compounds -VOCs emissions (kt)</li> <li>4. Particulate Matters - PM10 emissions (kt)</li> <li>5. GHG emissions: CO2 equivalent (kt)</li> <li>6. Increase in energy efficiency in supported heating systems (%)</li> <li>7. Number of projects stimulating an environmentally responsible behaviour</li> </ol>
PA 4.	KAI 4.1. Development of infrastructure and management plans to protect biodiversity and Natura 2000	<ol style="list-style-type: none"> <li>1. Designated areas benefiting from nature conservation measures (ha) *</li> <li>2. Number of projects contributing to protection against natural disasters</li> <li>3. Number of projects stimulating an environmentally responsible behaviour</li> </ol>
PA 5.	KAI 5.1 Protection against floods	<ol style="list-style-type: none"> <li>1. Area of land protected against erosion (ha) b)</li> <li>2. Designated areas affected (ha) *</li> <li>3. Number of projects contributing to protection against natural disasters</li> <li>4. Number of people benefiting from flood protection measures (core indicator)</li> <li>5. Number of projects stimulating an environmentally responsible behaviour</li> </ol>
	KAI 5.2. Reduction of coastal erosion	<ol style="list-style-type: none"> <li>1. Area of land protected against erosion (ha) b)</li> <li>2. Designated areas affected (ha) *</li> <li>3. Number of projects contributing to protection against natural disasters</li> <li>4. Number of projects</li> </ol>



		stimulating an environmentally responsible behaviour
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Analysing the link between SEA recommendations and environmental indicators at the level of SOP ENV it was noticed that 19 indicators were transposed from the SEA report to the Framework Implementation Document (see above diagram).

There are several interventions for which the FDI for SOP ENV requires more indicators to be monitored than the SEA report in PA1 and PA2).

#### 2.1.4. CORE INDICATORS

The following table shows the correspondence between existing indicators of SOP ENV and the core indicators which the European Commission suggests that Member States apply across ERDF and Cohesion Fund programmes, wherever appropriate, to facilitate comparable reporting among Member States (Working Document 7<sup>8</sup>).

FIG 4 CORE INDICATORS IN SOP ENV

<b>Selected CORE Indicators that apply to SOP ENV</b>	<b>OP Environment Indicators</b>	<b>Comments</b>
(25) Additional population served by water projects	Additional population connected to drinking water supply services (no.)	It was introduced as a supplementary indicator, specifically for matching the core indicator.
(26) Additional population served by waste water projects	Population equivalent for which waste water is treated according to NTPA (no.)	It was introduced as a supplementary indicator, specifically for matching the core indicator.
(27) Number of waste projects	-	The indicator was not introduced in list of SOP ENV.
(28) Number of projects on improved air quality	Projects for air quality improvement (no.)	It was introduced as a supplementary indicator, specifically for matching the core indicator.
(29) Area rehabilitated (km <sup>2</sup> )	Area rehabilitated – historically contaminated sites (ha)	It was introduced as a supplementary indicator, specifically for matching the core indicator.
(30) Reduction of greenhouse gas emissions (CO <sub>2</sub> and equivalents, kt)	-	Not applicable for SOP ENV.
(31) Number of projects (Risk prevention)	Projects for natural risks prevention (no.)	It was introduced as a supplementary indicator, specifically for matching the core indicator.

(32) Number of people benefiting from flood protection measures	Population benefiting from floods protection projects (no.)	It was introduced as an output indicator for KAI 5.1
(33) Number of people benefiting from forest fire protection and other protection measures	Population benefiting from the implementation of measures – natural risks prevention (no.)	It was introduced as a supplementary indicator, specifically for matching the core indicator.

The analysis of the adoption of core indicators shows that:

- the existing system of indicators does not include the exact label of core indicators in WD No 7. However, some supplementary indicators at PA 1, PA 2 and PA 5 levels are similar as those included in the Working Document. They resulted from the revision process of SOP ENV indicators conducted by ACIS and MA SOP ENV that took account the need for integrating core indicators;
- there are two CORE indicators that is not integrated in the current system:
  - *(27) Number of waste projects;*
  - *(30) Reduction of greenhouse gas emissions (CO2 and equivalents, kt)*

While for the first (core indicator 27) it is recommended to be integrated in the system, the core indicator *(30) Reduction of greenhouse gas emissions (CO2 and equivalents, kt)* falls outside the SOP ENV interventions. Therefore it should not be included in the system of indicators for SOP ENV<sup>9</sup>. A different situation is in the case of the proposed context indicator "*Reduction of greenhouse gas emissions*", which includes all gases (CO2, CH4, SO2, NOx and other), the contribution of SOP ENV being easily calculated at the emission source, at the end of each project implementation.

- for the quantification of the core indicator *(27) Number of waste projects*, the *number of waste projects* (KAI 2.1) should be added as resulted from the analysis of Intervention Logic .

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<sup>9</sup> Romania is committed to follow the LCP Directive which imposes monitoring requirements only for SO2 and NOx reduction, not for CO2 and equivalents, as the core indicator specifies.

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## 2.2. BALANCE

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In order to assess the balance of the indicators system of SOP Environment, two main issues were analysed:

- 1) **Proportionality**
- 2) **Distribution by types of indicators** (input, output, result, impact).

The analysis of proportionality started from the guidelines provided by the EC Working Document No. 2<sup>10</sup>:

*"The indicator systems of complex programmes (e.g., within the Convergence Objective) with a high number of priorities and measures will necessarily be more difficult to manage than the system of a smaller programme. The challenge is to design indicator systems as complex as necessary and as small as possible under the specific circumstances of a specific programme. The aim is not to achieve an equal coverage of all programme and priority objectives. The impact and result indicators should cover priorities or measures which represent the bulk of expenditure or are of strategic importance from the point of view of programme objectives or the information needs of the potential users."*

The following aspects were extracted as being the most relevant for the analysis:

- Generally result and impact indicators need most care and are not necessary to be assigned to every intervention financed under the programme. Since SOP Environment does not have impact indicators, result indicators were given careful consideration and were chosen as the first criterion;
- Complexity of the intervention should be taken into account: in the sense of this analysis, a complex intervention within SOP Environment is one with several possible results and/or with long term or complicated implementation<sup>11</sup>;
- The system of indicators should take into account the scale of the intervention; therefore, financial allocation was one of the criteria for analysis.

The analysis was based both on the quantitative data provided by the next table (number of indicators, financial allocation) and on qualitative information, such as types of interventions (indicative operations and activities) supported by each PA. A summary of these is presented in the *Objectives Covered* sub-section. More details can be found in the Operational Programme and in the Framework Document of Implementation. As such:

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<sup>10</sup> DG Regional Development, Indicative Guidelines on Evaluation Methods: Monitoring and Evaluating Indicators, Working Document No.2, Aug.2006, p.21 [Note: Methodological details will be removed in the final version and transferred in the overall cover section of the Analysis Report, to avoid duplication]

<sup>11</sup> Own interpretation, starting from the EC understanding of a complex programme

Funds <sup>12</sup> (MEUR)	Categories										
	Input (allocation)	Output			Result			Impact	Total		
		P	S	Total	P	S	Total		P	S	Total
Axis 1: 3,267	58%	2	6	8	3	4	7	0	5	10	15
Axis 2: 1,168	21%	4	6	10	1	0	1	0	5	6	11
Axis 3: 458	8%	2	2	4	3	5	8	0	5	7	12
Axis 4: 215	4%	1	8	9	1	2	3	0	2	10	12
Axis 5: 329	6%	2	3	5	3	2	5	0	5	5	10
Axis 6: 174	3%	8	13	21	0	1	1	0	8	14	22
Total funds: 5,611	100% (23.5 % of NSRF)	19	38	57	11	14	25	0	30	52	82
<b>TOTAL</b>		57			25			0	82		

Following the analysis of the proportionality of the indicators system based both on the quantitative data provided by the previous table (number of indicators) and on qualitative information, such as number and types of interventions (activities) supported by each PA, it was outlined that:

- Priority Axis 1 has the largest allocation (marked by ++) and supports a number of 7 interventions related to large infrastructure projects (++).
- Priority Axis 2 has a relatively high allocation, although approx 1/3 of the PA 1 allocation (+) and supports 8 interventions (++) related to infrastructure projects;
- Priority Axis 3 has a small allocation compared to PA 1 (marked with -), and it supports 6 interventions (+) related to large infrastructure projects.
- Priority Axis 4 has a small allocation – half the allocation for PA 3 (marked with --) and it supports a number of 8 interventions related to smaller projects (marked with ++).
- Priority Axis 5 has a small allocation (marked with --) and supports a number of 5 interventions (marked with +).
- Priority Axis 6 has the smallest allocation (---) and supports 16 interventions of a 'soft' nature (++) .

The analysis is synthesized in the following table:

<sup>12</sup>Based on: Financial plan of the SOP Environment giving, for the whole programming period, the amount of the total financial allocation of each fund in the operational programme, the national counterpart and the rate of reimbursement by priority axis, Chapter 4 - Financial Plan, SOP Environment, EN version, 2007, p. 98

FIG. 7 BALANCE OF SOP ENV SYSTEM OF INDICATORS

	Priority Axis 1	Priority Axis 2	Priority Axis 3	Priority Axis 4	Priority Axis 5	Priority Axis 6
Complexity	++	++	+	++	+	++
Financial allocation	++	+	-	--	--	---
Ideal number of indicators	High (20%)	Medium-High (15%)	Medium-Small (13%)	Medium-High (15%)	Small (10%)	High (20%)
Existing number of indicators	18.29%	13.41%	14.63%	14.63%	12.20%	26.83%
Conclusion	Proportion seems appropriate	Proportion seems appropriate	Proportion seems appropriate	Proportion seems appropriate	Proportion seems appropriate	Proportion may be improved

In respect to analyzing the **distribution between the output/result indicators**, the following observations can be made:

- Priority Axis 1: has a balanced distribution between output indicators (8) and the result indicators (7). Caution is necessary in interpreting this information, since the previous chapter signals that some interventions do not have any output or result indicators;
- Priority Axis 2: it has a number of 10 output indicators and only 1 result indicator; Most of KAI 2.1 interventions and none of KAI 2.2 ones have any result indicators;
- Priority Axis 3: has a smaller number of output indicators (4) than result indicators (8); caution is necessary in interpreting this information, since the previous chapter signals that some interventions do not have any output or result indicators;
- Priority Axis 4: has a smaller number of result indicators (3) than output indicators (9). Again, caution is necessary in interpreting this information, since the previous chapter signals that some interventions do not have any output or result indicators;
- Priority Axis 5: has a balanced distribution between output indicators (5) and the result indicators (5). Caution is necessary in interpreting this information, since the previous chapter signals that some interventions do not have any output or result indicators;
- Priority Axis 6: has the largest number of indicators (22), of which 21 are output indicators. Kai 6.1. has no result indicator allocated.

None of the PAs has any impact indicators associated.

The overall conclusion is that SOP ENV is not well balanced as regard the distribution by types of indicators (output, result, impact). However, any recommendation in this respect should be made in relation to the findings and conclusions of all the other components of the analysis. A special attention should be paid to the fact that, as mentioned in the previous sections, the system contains a number of indicators that overlap, and therefore the necessary number of indicators for the measurement of programme performance could be lower.

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## 2.3. MANAGEABILITY

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### 2.3.1. OVERVIEW

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This section assesses the main processes involved in working with SOP ENV indicators, namely collecting, measuring, processing, monitoring and communicating/reporting. The analysis covers also briefly the institutional context, the procedures and the resources available for running the above mentioned processes, from the specific SOP ENV viewpoint.

Institutions in charge with SOP ENV indicators	Types of indicators	Role
		Direct
Managing Authority for SOP ENV	<ul style="list-style-type: none"> <li>- Financial</li> <li>- Performance</li> </ul>	<ul style="list-style-type: none"> <li>- Defining</li> <li>- Processing</li> <li>- Measuring (Analysing)</li> <li>- Monitoring Communication</li> </ul>
Eight intermediate Bodies	<ul style="list-style-type: none"> <li>- Financial</li> <li>- Performance</li> </ul>	<ul style="list-style-type: none"> <li>- Collecting</li> <li>- Processing</li> <li>- Measuring (Analysing)</li> <li>- Monitoring Communication</li> </ul>

#### ***Institutions***

Apart from the Managing Authority, SOP ENV has **eight Intermediate Bodies**, located at the headquarters of the Regional Environment Protection Agencies (REPA). This implies the delegation of MA's tasks related to OP implementation (including evaluation, contracting, monitoring of projects and communication) to the NUTS 2 regional IBs, through a Tasks Delegation Agreement. This means that the connection with project beneficiaries and consequently the processing of indicator is mainly done through the IBs, while the MA is responsible for defining indicators and for collecting, processing etc. the information received from the IBs.

As for all the OPs implemented through IBs, the functionality of the system is significantly influenced by the performance of the IBs, on the one hand and on the quality of the instructions and guidance received from the MA, on the other hand. Any of the above two factors can affect the performance in respect to using indicators.

Another factor that may influence the manageability of the system is the relationship between the managing structures (MA/IBs) and beneficiaries. In the case of SOP ENV, these are represented by:

- Regional Operators for water and sewage services which are commercial companies established by local authorities gathered under an Intercommunity Development Association (IDA) for PA 1;
- County Councils, Local Councils, authorities of local public administration - LPA for PA 2 and PA 3;
- Administrators of protected areas, the Agency of Protected Natural Areas (APNA), NGOs, universities, LPAs, research institutes and museums for PA 4;

- The “Romanian Waters” National Administration (RWNA), public institution under the coordination of the Ministry of Environment Protection and Forests, sole beneficiary for PA 5;
- MA SOP ENV, as well as IBs and beneficiaries of other PAs for the training activities, for PA 6.

Except for the beneficiary under the PA 4, all the others are structures outside the coordination of the Ministry of Environment and Forests. Moreover, most of them are LPAs, governed by local representatives directly elected by the population. This implies large local autonomy in terms of setting the investment agenda, which in some cases leads to projects financed under SOP ENV not being always top priorities.

In terms of indicator related processes, in practice, several bottlenecks were caused by the lack of better communication between the SOP ENV MA and beneficiaries<sup>13</sup>.

### ***Procedures***

The MA SOP ENV issued specific procedures for using indicators. While collection and reporting are quite easy to be observed, communication is done with difficulty. Although the existing institutional agreements, as well as the communication flows, are functional, training on specific issues, guidelines and instructions are considered necessary, so as to improve working with indicators.

### ***Resources***

In respect to the allocation of responsibilities and resources, a detailed outlay of the staff allocated for each structure responsible for the management of SOP ENV, including monitoring and evaluation, is presented in their corresponding internal procedures. Additionally, the Description of the Management and Control System of SOP ENV includes a nominal overview of the organisational structure as per November 2008.

## **2.3.2. DEFINING INDICATORS**

Defining indicators is the responsibility of MA SOP ENV. An initial list of programme indicators was defined during the programming exercise, validated through the ex-ante evaluation and approved by the EC as part of the OP. Starting with 2009, an additional number of supplementary indicators were added, based on the consultations between SOP ENV MA and ACIS, so as to correct some deficiencies identified during the implementation and to improve correlation across OPs. These consultations were aimed at simplify the monitoring system, by avoiding the duplication of indicators in the case they apply to more categories of interventions. At the same time, the exercise was meant to bring more clarity and value-added in the way each of the interventions is monitored.

### ***Simplifying definitions***

The simplification process led to the use of „Action Category”, following a common approach for all OPs<sup>14</sup>. Consequently, instead of having two indicators to reflect the length of a new water supply

<sup>13</sup> See preliminary results of study “*Review of investment in transport and environment infrastructure*”, developed as part of the ACIS project “*Carrying out Evaluations during the implementation of the National Strategic Reference Framework (NSRF) and the Operational Programme Technical Assistance (OPTA)*”

<sup>14</sup> In order to avoid redundancy, a more description of the use of action categories is introduced in the cover section of the Analysis Report.



network and of a rehabilitated water supply network, one can just attach two action categories (“new” and “rehabilitated”) to the same indicator that reflects the length of water supply network. This enabled a potential reduction of the number of indicators.

However, the supplementary indicators and the Action Categories have not been yet recognized as such and included in any official SOP ENV documents by the MA. As a result, the Framework Document for Implementation is combining the indicator names with their respective Action Categories, without explaining the use of intervention categories. Allowing the use of Action Categories would greatly simplify the list of indicators. Also, the current list of Action Categories should not be seen as final, as in some cases, adding more categories may reflect and monitor better the nature of the interventions.

### ***Clarifying definitions, labels and measurement units***

The purpose of adding more clarity was taking into account when a few supplementary indicators were added in order to better assess the result of the planned intervention (e.g. “*Population connected to water services in a regional management system*” instead of “*Additional population equivalent connected to water supply services*”).

However, the initial programme indicators were not removed, so now both the programme and the supplementary indicators are defined within the monitoring system. This is causing a certain degree of redundancy and should be further simplified.

Some supplementary indicators do not seem to be different of the ones initially introduced in the Programme, such as the programme indicator “*central heating systems rehabilitated (number)*” and the supplementary indicator “*central heating systems rehabilitated (no.)*”. These overlaps should be further analysed and taken into consideration for simplification purposes.

As regards the measurement unit, there still is a lot of inconsistency. Several indicators have the measurement unit included in the definition, such as “*Number of waste management integrated systems*”. Others have the measurement unit expressed in brackets at the end of the definition, which seems far more appropriate. Therefore, it is advisable to provide a minimum level of standardization, and place all measurement units at the end of the definitions.

### **2.3.3. COLLECTING INDICATORS**

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Once the indicators were defined and included in the Framework Document for Implementation (both initial programme indicators and supplementary ones), their collection became mandatory, based on the SOP ENV procedures.

One of the specificities of SOP ENV indicators is data collection, which rests with the IBs.

However, project level information is not enough to collect all required SOP ENV indicators, which is quite obvious. Only some of the output indicators may be compiled based on direct information from beneficiaries. For result/context indicators, often a more complex analysis is required, which will imply more than information from beneficiaries (e.g. use of national statistics etc.). The typical data flow in the case of environment is different than that of economic, social or demographic statistics and is generated directly from the environment information system. An important part of the data is gathered through instruments for the observation and supervision of environment. Another source is represented by statistic surveys in economic fields related to activities impacting the environment (energy, industry, agriculture, forestry etc) as well as environment specific surveys.

For the indicators which cannot be calculated based on input from beneficiaries, there is a need to define in a more clear way the collection procedure. This implies a closer link to official Environment statistics and an enhanced capacity to analyse statistical indicators within the SOP ENV MA. This applies to most of the result indicators. Moreover, the SOP ENV does not have currently any official context indicators, which is a weakness in terms of its overall monitoring. The proper collection of context indicators is also heavily related to existing of good and reliable statistics in the field of Environment.

#### 2.3.4. PROCESSING AND MEASURING INDICATORS

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##### ***Vertical aggregation***

**Connecting project level to programme level indicators** is crucial to facilitate proper processing and measuring of SOP ENV indicators. Currently, there is no perfect match between the indicators required in the application process, the ones required in the progress/financial reporting and the programme indicators. The Applicants' Guide only states that indicators "should be "relevant for the project, sensitive and based on available data", while "the formulation of indicators must take into consideration the indicators established for SOP ENV PA [...], as defined in the FDI."<sup>15</sup>

Therefore, better coordination is needed in order to harmonize project level indicators with programme level ones. Pre-set indicators in the application form would provide the necessary coordination for the beneficiaries and would prevent the arbitrary choice of indicators which cannot be aggregated further at programme level.

##### ***Horizontal aggregation***

Processing and measuring some of SOP ENV interventions cannot be done completely independent from other OPs. In order to achieve this, a coherent, common approach would highly improve the quality and the added value of the information obtained through aggregating indicators.

One of the features specific to the SOP ENV is the existence of the strategic environmental impact assessment indicators, applicable at NSRF level, across OPs. This implies that indicators which are programme level indicators for SOP ENV can also be treated as SEA indicators. For example, indicators such as "*Reduction of greenhouse gas emissions*" is monitored both as a result indicator for SOP ENV and as a SEA indicator for other OPs, such as OP Transport.

Consequently, in order to allow aggregation at NSRF level, there should be a match between the definition/label of the SOP ENV and SEA indicators.

Another relevant case for horizontal coordination in using indicators within SOP ENV is related to the use of TA indicators (see also OPTA analysis).

#### 2.3.5. PROGRESS MONITORING

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Through an addendum to the Delegation Agreement, MA SOP ENV delegated to IBs tasks related to contracts' monitoring. As stated earlier, the quality of the monitoring is heavily influenced by the performance of the IBs and by the guidance provided by the MA.

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<sup>15</sup> See for example Application Form for PA4, call for proposals 4, page 24. <http://www.posmediu.ro/axaprioritara4>

One specific feature of SOP ENV is that most of the planned investment is focused on a number of projects of a high value (except for PA 4 and PA 6). This means a lower number of projects than in several other OPs, which should in principle simplify progress monitoring. At the same time, it implies that **output indicators would be highly sensitive to the development of a few large projects.**

Another **specificity of SOP ENV** is that indicators that measure pollution of environment factors such as air and water are highly sensitive to other factors resulting from human activity, so it is difficult to estimate the exact results of OP interventions. Noteworthy, another specific feature of several environment indicators is the high frequency of statistical monitoring (for eg. air pollution is monitored permanently through sensor systems centralized across the country) which enables accurate progress monitoring in this respect.

### 2.3.6. COMMUNICATION

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In terms of communication and reporting, the values of most output indicators related to infrastructure achievements will be available for reporting only at larger time intervals, which in turn means an additional **difficulty on conveying information on the OP progress.** This is an issue specific to infrastructure related OPs (see also SOP T), which also complicates reporting to the EC in terms of conveying real progress.

The indicators related to environment changes are regularly monitored and collected at local, regional and national level, but it is difficult to relate all of them to the SOP ENV measures, as explained above.

Although sustainable development is strongly promoted at both national and European level, the level of awareness and interest related to typical environment indicators is still low in the Romanian society, with the exception of lobby groups (e.g. NGOs). This implies usually that the supply of environment related data is higher than the average demand of such data from the population. Therefore, when communicating SOP ENV indicators it may be advisable to avoid sophisticated reporting and “translate” them into simple messages which can be easily digested by the general public.

#### ***Preliminary conclusions***

Given all the above, a number of preliminary conclusions regarding manageability can be reached:

- The use of Action Categories can be helpful in simplifying definitions. On the other hand, some of the existing Action Categories are not reflecting properly the specificities of covered interventions (e.g. TA AC)
- The overlapping indicators affect the manageability of the system, in terms of resources needed for collecting, measuring and reporting.
- The process of collecting result/context indicators can be quite demanding, in the sense of requiring adequate and accurate national statistics.
- Applicant guidelines and forms are too general in respect to monitoring indicators in the field of environment
- Environment related indicators are not relevant only to SOP ENV but also at NSRF level, given SEA exercises.

- For several interventions, collection and progress monitoring is heavily dependent on the capacity of the beneficiaries and of the IBs.
- Progress monitoring is heavily dependent on a few large infrastructure projects.
- Communication of SOP ENV indicators depends on the level of awareness and understanding of the public related to environmental specific interventions.

FIG. 1 SYNTHESIS OF THE ANALYSIS OF THE SYSTEM OF INDICATORS

OUTPUT INDICATORS								
KAI	Crt. no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
KAI 1.1	*	New and modernised drinking water sources (no.)	*	Add		Following the intervention logic the indicator is required to measure the construction/modernisation of water drinking sources.	-	-
	1.	Localities provided with new/rehabilitated water facilities in a regional system (number)	P	Remove		Incorrectly assigned as output indicator.	It overlaps with result indicator 4.	-
	2.	WWTP new/rehabilitated (no.)	P	Remove		-	It overlaps with indicator 3; its use becomes redundant.	-
	3.	WWTP new and rehabilitated (no.)	S	Keep		-	-	The indicator definition allows processing/measurement of total "new and rehabilitated WWTP"
	4.	Treatment plants new and rehabilitated (no.)	S	Keep		-	-	-
	*	New and rehabilitated facilities for the sludge generated in WWTP (no.)	*	Add		Following the intervention logic the indicator is required to measure the construction/rehabilitation of treatment facilities for the		

<sup>16</sup> P=programme, S=supplementary

**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
						sludge generated in WWTP.		
	5.	Length of water supply network – newly built (km)	S	Keep		-	-	-
	6.	Length of water supply network – rehabilitated (km)	S	Keep		-	-	-
	7.	Length of sewage network – newly built (km)	S	Keep		-	-	-
	8.	Length of sewage network – rehabilitated (km)	S	Keep		-	-	-
	*	Equipment purchased for metering, laboratory, loss detection, and other uses (no.)	*	Add		Following the intervention logic the indicator is required to measure metering, laboratory equipment, loss detection equipment.		
	*	Total amount of advisory services received (expertise and advice) (man-days)	*	Add		Following the intervention logic the indicator is required to measure the TA for project preparation, management and supervision, publicity , institutional		

**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation	Rationale			
					COVERAGE	BALANCE	MANAGEABILITY	
					governance improvement.			
KAI 2.1	*	New selective collection systems installed (no.)	*	Add		Following the intervention logic the indicator is required to measure selective collection systems installed.	-	-
	9.	Number of new integrated waste management systems at county/regional level (number)	P	Remove		-	It overlaps with indicator 12; its use becomes redundant.	-
	*	Quantity of gas recovered from landfills/year (m3)	*	Add		Following the intervention logic the indicator is required to measure the gas recovered from landfills.		
	*	New facilities for municipal hazardous waste and other specific categories, including new equipment for municipal waste facilities and other specific categories of waste (no.)	*	Add		Following the intervention logic the indicator is required to measure the construction of adequate facilities for municipal hazardous waste and other specific waste categories, including purchase and installation of equipment for municipal waste management		

## OUTPUT INDICATORS

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
						facilities, and other specific categories of waste		
	10.	Old closed waste landfills in rural areas (small) - number	P	Remove	-	-	It overlaps with indicator 14; its use becomes redundant.	-
	11.	Old closed municipal waste landfills in urban areas (number)	P	Remove	-	-	It overlaps with indicator 15; its use becomes redundant.	-
	12.	New waste management systems	S	Keep	Label as “ <i>New waste management systems (no.)</i> ”	-	-	Label allows the use of measurement unit.
	13.	Extended waste management systems (no.)	S	Keep		-	-	-
	14.	Waste landfills (old, noncompliant) in rural areas (small), closed (no.)	S	Keep		-	-	-
	15.	Municipal waste landfills (old) in urban areas, closed (no.)	S	Keep		-	-	-
	16.	Population benefiting from implementation of measures – waste management (no.)	S	Remove	<a href="#">Transfer to result indicators</a>	Incorrectly assigned as output indicator.	-	-
	*	Waste projects (no.)	*	Add		Matches core indicator (27)		
	*	Total amount of advisory services received (expertise and	*	Add		Following the intervention logic the indicator is required		



**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
		advice) (man-days)				to measure the TA for project preparation, management and supervision, publicity, institutional governance improvement, tendering and contracting.		
KAI 2.2	17.	Pilot projects for the rehabilitation of historically contaminated sites (no)	P	Keep		-	-	-
	18.	Rehabilitated area – historically contaminated sites (ha)	S	Keep		Matches core indicator (29)	-	-
	*	Total amount of advisory services received (expertise and advice) (man-days)	*	Add		Following the intervention logic the indicator is required to measure the TA for project preparation, option studies, management and supervision, and publicity.	-	-
KAI 3.1	19.	Central heating systems rehabilitated (number)	P	Remove	-	-	It overlaps with indicator 21; its use becomes redundant.	
	20.	Option studies elaborated	P	Replace	Use of indicator “ <i>Studies, analyses, reports, strategies (no.)</i> ”	-	It eliminates the overlapping of indicators.	For simplification, it can be easily included in “ <i>Studies, analyses,</i>

OUTPUT INDICATORS								
KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
								<i>reports, strategies”.</i>
	21.	Central heating systems rehabilitated (no.)	S	Keep		-	-	-
	22.	Projects for air quality improvement (no.)	S	Keep		-	-	-
	*	Improved metering, systems (no.)	*	Add		Following the intervention logic the indicator is required to measure metering systems.		
	*	Total amount of advisory services received (expertise and advice) (man-days)	*	Add		Following the intervention logic the indicator is required to measure the TA for project preparation, management, supervision, and publicity, including public awareness campaigns.	-	-
KAI 4.1	*	Studies, analyses, reports, strategies (no.)	*	Add		Following the intervention logic the indicator is required to measure the elaboration of scientific studies, inventory, mapping.	-	Increases consistency across PAs and OPs.

**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	23.	Protected areas and Natura 2000 sites, with management plans in force/approved (number)	P	Remove		Incorrectly assigned as output indicator.	It overlaps with result indicator 19; its use becomes redundant	
	24.	Proposed sites in Natura 2000 network benefiting from measures implementation (no.)	S	Keep	Label as <i>“Proposed sites in Natura 2000 network and protected areas benefiting from measures implementation (no.)”</i>	The definition is not broad enough to reflect the interventions in both protected areas and Natura 2000 sites.	-	-
	*	Restored landscape (km)	*	Add		Following the intervention logic the indicator is required to measure the defragmentation of landscape.	-	-
	25.	Habitats ecologically rehabilitated (no.)	S	Keep		-	-	-
	*	Purchased land with significant value in terms of biodiversity becoming public property (ha)	P	Add		Following the intervention logic the indicator is required to measure the output of land purchase in public property, for biodiversity-related reasons.	-	-
	26.	Communication and promotion events within nature conservation activities (no.)	S	Keep	Label as <i>“Communication and promotion events (number)”</i>	-	-	Improves consistency across PAs and OPs.

**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	27.	Information and publicity materials within nature conservation activities (no.)	S	Keep	Label as <i>“Information and publicity materials (number)”</i>	-	-	Improves consistency across PAs and OPs.
	28.	Implemented/ extended IT systems within nature conservation activities (no.)	S	Keep	Label as <i>“Implemented/ extended IT systems (number)”</i>	-	-	Improved accuracy for labelling.
	29.	Participant training days – beneficiaries, within nature conservation activities (no.)	S	Keep	Label as <i>“Participant training days – beneficiaries (number)”</i>	-	-	Improves consistency across PAs and OPs.
	30.	Participant training days – other structures, within nature conservation activities (no.)	S	Keep	Label as <i>“Participant training days – other structures (number)”</i> AC 204 – Nature conservation	-	-	Improves consistency across PAs and OPs.
	31.	Management plans elaborated/revised (no.)	S	Keep		-	-	-
KAI 5.1	32.	Projects approved on floods protection (number)	P	Remove	-	-	It overlaps with indicator 34; its use becomes redundant.	
	33.	Protected area through protection works against floods risk (km2)	S	Keep		-	-	-

**OUTPUT INDICATORS**

KAI	Crt. no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	34.	Projects for natural risks prevention (no.)	S	Keep		Matches the core indicator (31)	-	-
	*	Total amount of advisory services received (expertise and advice) (man-days)	*	Add		Following the intervention logic the indicator is required to measure the TA for project preparation, management, supervision, and publicity.	-	-
KAI 5.2	35.	Length of rehabilitated seashore (km)	P	Remove	-	-	It overlaps with indicator 36; its use becomes redundant.	
	36.	Length of rehabilitated seashore – natural risks prevention (km)	S	Keep		-	-	-
	*	Total amount of advisory services received (expertise and advice) (man-days)	*	Add		Following the intervention logic the indicator is required to measure the TA for project preparation, management, supervision, and publicity.	-	-
KAI 6.1	37.	Meetings of the Monitoring Committee organised (no./year)	P	Remove	-	-	It overlaps with indicator 43; its use becomes redundant.	

**OUTPUT INDICATORS**

KAI	Crt. no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	38.	Call for proposals supported by TA (number)	P	Keep		-	-	-
	39.	Staff trained (no./year)	P	Remove	-	-	It overlaps with indicator 43; its use becomes redundant.	-
	*	Specific IT applications purchased (no.)	*	Add		Following the intervention logic the indicator is required to measure the IT applications purchased.	-	-
	40.	Applications assessed with TA support (no.)	P	Keep		-	-	-
	41.	Evaluation reports elaborated (no.)	P	Replace	Use of indicator “ <i>Studies, analyses, reports, strategies (no.)</i> ”	-	-	The indicator is not defined broadly enough to allow processing/ measurement of all types of paperwork, including reports.
	42.	Thematic studies/strategies elaborated (no.)	P	Replace	Use of indicator “ <i>Studies, analyses, reports, strategies (no.)</i> ”	-	-	The indicator is not defined broadly enough to allow processing/ measurement of all types of paperwork, including reports.
	43.	Meetings of relevant committees and working groups (no.)	S	Keep		-	-	-

**OUTPUT INDICATORS**

KAI	Crt. no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	44.	Participant training days – composed (no.)	S	Keep	Label as “Participant training days (no.)”	-	-	Improves consistency across KAIs and OPs.
	45.	Participant training days – beneficiaries (no.)	S	Keep		-	-	Improves consistency across KAIs and OPs.
	46.	Participant training days – managing structures (no.)	S	Keep		-	-	Improves consistency across KAIs and OPs.
	47.	Participant training days – other structures (no.)	S	Keep		-	-	Improves consistency across KAIs and OPs.
	*	Temporary staff contracted (man-days)	*	Add		Following the intervention logic the indicator is required to measure the remuneration of temporary staff.	-	-
	48.	Studies, analyses, reports, strategies (no.)	S	Keep		-	-	-
	49.	Guidelines and other methodological documents (no.)	S	Keep	Label as “Guidelines and other methodological instruments (number)”	Improved coverage of interventions.	-	Improves consistency across KAIs and OPs.
	50.	Events focused on experience exchange related to funds implementation and thematic aspects (no.)	S	Keep		-	-	-
	*	Total amount of advisory services	*	Add		Following the intervention logic the	-	Increases consistency across PAs and OPs.

**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale			
						COVERAGE	BALANCE	MANAGEABILITY	
		received (expertise and advice) (man-days)				indicator is required to measure the TA activities.			
KAI 6.2	*	Communication Plan designed and implemented (no.)	*	Add		Following the intervention logic the indicator is required to measure the Communication Plan design and implementation.	-	-	
	51.	Types of leaflets/brochures disseminated (number)	P	Remove	-		-	It overlaps with indicator 53; its use becomes redundant.	-
	52.	Press conferences organised	P	Remove	-		-	It overlaps with indicator 56; its use becomes redundant.	-
	53.	Information and publicity materials (no.)	S	Keep			-	-	-
	54.	Mass-media campaigns (no.)	S	Keep			-	-	-
	55.	Information requests received by the Information Centre (no.)	S	Keep	<a href="#">Transfer to result indicators</a>	Incorrectly assigned as output indicator	-	-	-
	56.	Communication and promotion events (no.)	S	Keep			-	-	-



**OUTPUT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>16</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	57.	Website visits (no.)	S	Keep	<a href="#">Transfer to result indicators</a>	Incorrectly assigned as output indicator	-	-

**RESULT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
KAI 1.1	1.	Population connected to water services in a regional system (%)	P	Remove	-	-	It overlaps with indicator 6; its use becomes redundant.	
	2.	Properly treated waste water (of the total waste water volume) - %	P	Remove	-	Incorrectly assigned as output indicator.	-	It should be calculated as context indicator.
	3.	Regional water companies created	P	Remove	-	The indicator doesn't cover any intervention within KAI 1.1.	-	-
	4.	Localities benefiting from new and rehabilitated facilities (no.)	S	Keep			-	-
	5.	Population equivalent for which waste water is treated according to NTPA 001 (no.)	S	Keep		Matches core indicator (26)	-	-
	6.	Additional population connected to water supply services (no.)	S	Keep		Matches core indicator (25)	-	-
	7.	Additional population equivalent connected to sewage services (no.)	S	Keep			-	-
	*	Decrease of losses in the distribution system (%)	*	Add		Following the intervention logic the indicator is required		

<sup>17</sup> P=programme, S=supplementary

**RESULT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
						to measure the results of metering, laboratory equipment, loss detection equipment.		
KAI 2.1	8.	Population benefiting from improved waste management systems (million inhabitants)	P	Remove	-	-	It overlaps with output indicator 16, which should be transferred to result indicators; its use becomes redundant.	-
	*	Energy generated by the use of biogas (kWh)	*	Add		Following the intervention logic the indicator is required to measure the results of the use of gas recovered from landfills.		
	*	Localities benefiting from new facilities for municipal hazardous waste and other specific categories, including new equipment for municipal waste facilities and other specific categories of waste	*	Add		Following the intervention logic the indicator is required to measure the results of the construction of facilities for municipal hazardous waste and other specific waste categories		
KAI 2.2	*	Rehabilitated area used for public/economic purposes (ha)	*	Add		Following the intervention logic the indicator is required to measure the rehabilitated area		

**RESULT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
						used for public/economic purposes.		
KAI 3.1	9.	Localities in which the air quality is improved due to rehabilitated heating systems (number)	P	Remove	-	-	It overlaps with indicator 12; its use becomes redundant.	-
	10.	Reduction of SO2 emissions from urban heating systems due to SOP interventions (tones)	P	Remove	-	-	It overlaps with indicator 13; its use becomes redundant	Improves consistency across OPs.
	11.	Reduction of NOx emissions from urban heating systems due to SOP interventions (tones)	P	Remove	-	-	It overlaps with indicator 14; its use becomes redundant	Improves consistency across OPs.
	12.	Localities in which the air quality is improved (no.)	S	Keep		-	-	-
	13.	Reduction of SO2 emissions (t)	S	Keep		-	-	-
	14.	Reduction of NOx emissions (t)	S	Keep		-	-	-
	15.	Rehabilitated thermal capacity (MWth)	S	Keep		-	-	-
	16.	Population benefiting from improved air quality (no.)	S	Keep		-	-	-

**RESULT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	*	Decrease of losses in the distribution system (%)	*	Add		Following the intervention logic the indicator is required to measure the results of introducing metering systems.		
KAI 4.1	*	Studies, analyses, reports, strategies implemented (no.)	*	Add		Following the intervention logic the indicator is required to measure the results of elaboration of scientific studies, inventory, mapping.	-	Increases consistency across PAs and OPs.
	*	Degree of satisfaction of training participants (%)	*	Add		Following the intervention logic the indicator is required to measure the results of staff training and assistance activities.	-	-
	17.	Surface of protected areas and Natura 2000 sites benefiting from nature conservation measures (% of total surface of protected areas)	P	Remove			It overlaps with indicator 18; its use becomes redundant.	-
	18.	Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)	S	Keep		-	-	-

RESULT INDICATORS								
KAI	Crt. no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	*	Species protected (no.)	*	Add		Following the intervention logic the indicator is required to measure the results of landscape defragmentation and purchase of land in public property.	-	-
	19.	Management plans implemented (no.)	S	Keep		-	-	-
	*	Population awareness level (%)	*	Add		Following the intervention logic the indicator is required to measure the results of public awareness campaigns.	-	-
KAI 5.1	20.	Population benefiting from floods protection projects (number inhabitants)	P	Keep		Matches the core indicator (32)	-	Although indicator “Population benefiting from measures implementation – natural risks prevention (no.)” is more suitable in measuring the results on population <sup>18</sup> and would increase the manageability of the system, this indicator is required to be reported by the EC, as core indicator.

<sup>18</sup>See also individual analysis of indicator “Population benefiting from measures implementation – natural risks prevention”

**RESULT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
	21.	Reduction of incidence to floods risk (%)	P	Keep		-	-	-
	22.	Population benefiting from measures implementation – natural risks prevention (no.)	S	Keep	Label as <i>“Population benefiting from forest fire protection and other protection measures (number)”</i>	Matches the core indicator (33)	-	NB: the split of AC 205 in two ACs (floods protection + forest fire protection and other protection measures) is not advisable, as it does not bring value added in terms of potential aggregation.
KAI 5.2	23.	Extension of coast area (%)	P	Remove	-	-	It overlaps with indicator 24; its use becomes redundant.	-
	24.	Extended coast area – natural risks prevention (km <sup>2</sup> )	S	Keep		-	-	-
	25.	Population awareness level (%)	S	Keep		-	-	-
KAI 6.1	*	Decreased number of irregularities (no.)	*	Add		Following the intervention logic the indicator is required to measure the results of the monitoring, audit, control and spot check missions.	-	-
	*	Reduced data processing time (hours)	*	Add		Following the intervention logic the indicator is required to measure the result	-	-

**RESULT INDICATORS**

KAI	Crt . no.	Indicators	Type <sup>17</sup>	Recommendation		Rationale		
						COVERAGE	BALANCE	MANAGEABILITY
						of using the IT applications.		
	*	Budget allocated to temporary staff (EUR)	*	Add		Following the intervention logic the indicator is required to measure the results of remunerating temporary staff.	-	-
	*	Degree of satisfaction of training participants (%)	*	Add		Following the intervention logic the indicator is required to measure the results of staff training and participation to experience exchange events.	-	Increases consistency across PAs and OPs.
KAI 6.2	*	Population awareness level (%)	*	Add		Following the intervention logic the indicator is required to measure the results of the Communication Plan implementation.	-	-



**FIG. 2 RESULTS OF THE OVERALL ANALYSIS OF THE SYSTEM OF INDICATORS**

PROGRAMME	1.	Projects in the environment sector (no.)
<b>PA 1. Expanding and upgrading water and wastewater systems</b>	<b>INPUT INDICATORS</b>	
	1.	Projects in the environment sector (no.)
	<b>OUTPUT INDICATORS</b>	
	1.	New and modernised drinking water sources (no.)
	2.	WWTP new and rehabilitated (no.)
	3.	Treatment plants new and rehabilitated (no.)
	4.	New and rehabilitated facilities for the sludge generated in WWTP (no.)
	5.	Length of water supply network – newly built (km)
	6.	Length of water supply network – rehabilitated (km)
	7.	Length of sewage network – newly built (km)
	8.	Length of sewage network – rehabilitated (km)
	9.	Equipment purchased for metering, laboratory, loss detection, and other uses (no.)
	10.	Total amount of advisory services received (expertise and advice) (man-days)
	<b>RESULT INDICATORS</b>	
	1.	Localities benefiting from new and rehabilitated facilities (no.)
	2.	Population equivalent for which waste water is treated according to NTPA 001 (no.)
	3.	Additional population connected to water supply services (no.)
4.	Additional population equivalent connected to sewage services (no.)	
5.	Decrease of losses in the distribution system (%)	
<b>PA 2. Development of integrated waste management and waste management infrastructure expansion</b>	<b>INPUT INDICATORS</b>	
	1.	Projects in the environment sector (no.)
	<b>OUTPUT INDICATORS</b>	
1.	New selective collection systems installed (no.)	

	2.	Quantity of gas recovered from landfills/year (m3)
	3.	New facilities for municipal hazardous waste and other specific categories, including new equipment for municipal waste facilities and other specific categories of waste (no.)
	4.	New waste management systems (no.)
	5.	Extended waste management systems (no.)
	6.	Waste landfills (old, noncompliant) in rural areas (small), closed (no.)
	7.	Municipal waste landfills (old) in urban areas, closed (no.)
	8.	Waste projects (no.)
	9.	Total amount of advisory services received (expertise and advice) (man-days)
	10.	Pilot projects for the rehabilitation of historically contaminated sites (no.)
	11.	Rehabilitated area – historically contaminated sites (ha)
	<b>RESULT INDICATORS</b>	
1.	Energy generated by the use of biogas (kWh)	
2.	Localities benefiting from new facilities for municipal hazardous waste and other specific categories, including new equipment for municipal waste facilities and other specific categories of waste	
3.	Rehabilitated area used for public/economic purposes (ha)	

<b>PA 3. Pollution reduction and mitigation of climate change by restructuring and renovating urban heating systems to achieve energy efficiency targets in areas most affected by pollution</b>	<b>INPUT INDICATORS</b>	
	1.	Projects in the environment sector (no.)
	<b>OUTPUT INDICATORS</b>	
	1.	Studies, analyses, reports, strategies (no.)
	2.	Central heating systems rehabilitated (no.)
	3.	Projects for air quality improvement (no.)
	4.	Improved metering, systems (no.)
	5.	Total amount of advisory services received (expertise and advice) (man-days)

	<b>RESULT INDICATORS</b>	
	1.	Localities in which the air quality is improved (no.)
	2.	Reduction of SO2 emissions (t)
	3.	Reduction of NOx emissions (t)
	4.	Rehabilitated thermal capacity (MWth)
	5.	Population benefiting from improved air quality (no.)
	6.	Decrease of losses in the distribution system (%)

<b>PA 4. Implementation of appropriate management systems for environmental protection</b>	<b>INPUT INDICATORS</b>	
	1.	Projects in the environment sector (no.)
	<b>OUTPUT INDICATORS</b>	
	1.	Studies, analyses, reports, strategies (no.)
	2.	Proposed sites in Natura 2000 network benefiting from measures implementation (no.)
	3.	Restored landscape (km)
	4.	Habitats ecologically rehabilitated (no.)
	5.	Purchased land with significant value in terms of biodiversity becoming public property (ha)
	6.	Communication and promotion events within nature conservation activities (no.)
	7.	Information and publicity materials within nature conservation activities (no.)
	8.	Implemented/ extended IT systems within nature conservation activities (no.)
	9.	Participant training days – beneficiaries, within nature conservation activities (no.)
10.	Participant training days – other structures, within nature conservation activities (no.)	
11.	Management plans elaborated/ revised (no.)	
<b>RESULT INDICATORS</b>		

	1.	Studies, analyses, reports, strategies implemented (no.)
	2.	Degree of satisfaction of training participants (%)
	3.	Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)
	4.	Species protected (no.)
	5.	Management plans implemented (no.)
	6.	Population awareness level (%)

<b>PA 5. Implementation of adequate infrastructure for natural risk prevention in most vulnerable areas</b>		<b>INPUT INDICATORS</b>
	1.	Projects in the environment sector (no.)
		<b>OUTPUT INDICATORS</b>
	1.	Protected area through protection works against floods risk (km <sup>2</sup> )
	2.	Projects for natural risks prevention (no.)
	3.	Total amount of advisory services received (expertise and advice) (man-days)
	4.	Length of rehabilitated seashore – natural risks prevention (km)
		<b>RESULT INDICATORS</b>
	1.	Population benefiting from floods protection projects (no. of inhabitants)
	2.	Reduction of incidence to floods risk (%)
	3.	Population benefiting from measures implementation – natural risks prevention (no.)
	4.	Extended coast area – natural risks prevention (km <sup>2</sup> )
	5.	Population awareness level (%)

<b>PA 6. Technical assistance</b>		<b>INPUT INDICATORS</b>
	1.	Projects in the environment sector (no.)
		<b>OUTPUT INDICATORS</b>
	1.	Call for proposals supported by TA (no.)
	2.	Specific IT applications purchased (no.)

3.	Applications assessed with TA support (no.)
4.	Studies, analyses, reports, strategies (no.)
5.	Audit, control and spot-check missions (no.)
6.	Meetings of relevant committees and working groups (no.)
7.	Demonstration activities in order to apply modern solutions for integrated water management and innovative environmental technologies (no.)
8.	Participant training days (number) <ul style="list-style-type: none"> <li>- beneficiaries</li> <li>- managing structures</li> <li>- other structures</li> </ul>
9.	Temporary staff contracted (man-days)
10.	Guidelines and other methodological documents (no.)
11.	Events focused on experience exchange related to funds implementation and thematic aspects (no.)
12.	Communication Plan designed and implemented (no.)
13.	Information and publicity materials (no.)
14.	Mass-media campaigns (no.)
15.	Information requests received by the Information Centre (no.)
16.	Communication and promotion events (no.)
17.	Website visits (no.)
18.	Total amount of advisory services received (expertise and advice) (man-days)
<b>RESULT INDICATORS</b>	
1.	Decreased number of irregularities (no.)
2.	Reduced data processing time (hours)
3.	Budget allocated to temporary staff (EUR)
4.	Studies, analyses, reports, strategies implemented (no.)
5.	Applied modern solutions for integrated water management and innovative environmental technologies (no.)
6.	Degree of satisfaction of training participants (%)
7.	Population awareness level (%)

## ENVIRONMENT IMPACT INDICATORS

	1.	Population equivalent for which waste water is treated according to NTPA 001 (no.)
	2.	Additional population connected to water supply services (no.)
	3.	Additional population equivalent connected to sewage services (no.)
	4.	Decrease of losses in the distribution system (%)
	5.	Waste landfills (old, noncompliant) in rural areas (small), closed (no.)
	6.	Municipal waste landfills (old) in urban areas, closed (no.)
PROGRAMME	7.	Population benefiting from implementation of measures – waste management (no.)
PA1. Modernization and development of TEN-T priority axes aiming at sustainable transport system integrated with EU transport networks	8.	Energy generated by the use of biogas (kWh)
PA2. Modernization and development of the national transport infrastructure outside the TEN-T priority axes aiming at sustainable national transport system	9.	Rehabilitated area – historically contaminated sites (ha)
PA 3. Modernisation of transport sector aiming at higher degree of environmental protection, human health and passenger safety	10.	NOx emissions (kt)
PA 4. Implementation of appropriate management systems for environmental protection	11.	SO2 emissions (kt)
PA 5. Implementation of adequate infrastructure for natural risk prevention in most vulnerable areas	12.	Volatile Organic Compounds -VOCs emissions (kt)
	13.	Particulate Matters - PM10 emissions (kt)
	14.	Habitats ecologically rehabilitated (no.)
	15.	Species protected (no.)
	16.	Reduction of incidence to floods risk (%)
	17.	Population benefiting from measures implementation – natural risks prevention (no.)
	18.	Length of rehabilitated seashore – natural risks prevention (km)

## CONTEXT INDICATORS

Volume of treated waste water / volume of collected waste water

Average tariffs for urban water supply/sanitation services

Share of population supplied with drinking water from public water supply network

Percentage of urban agglomerations with wastewater treatment plants

Waste selectively collected: glass, plastic, paper & carton, mixed / total of waste collected

Ratio of population covered by sanitation services – urban/rural

Emissions of greenhouse effect gases

Seaside losses due to erosion



### 3. ANALYSIS OF THE INDIVIDUAL INDICATORS

The analysis of the individual indicators consisted of the examination of the existing input, output and result indicators **which passed the analysis at system level**. Indicators that were rejected after the analysis of the system were considered inherently flawed so as to make their individual analysis unnecessary. The reasons for their rejection, as well as suggestions for their replacements (where appropriate) were presented in the previous section.

The list of indicators subject to the current individual analysis includes the original programme indicators and supplementary indicators, introduced as an update through the common effort of MA SOP ENV and ACIS-ECU during the implementation so far. As no impact or context indicators are included in the current system, such categories are not covered by the analysis.

This list of output and result indicators was assessed against the four criteria for quality indicators as set out in the ToR, based on the DG Regional Policy Guidelines namely: “relevance”, “sensitivity”, “availability” and “cost”. Each indicator will be marked as follows:

**Relevance:** (+) little relevance; (++) relevant

**Sensitivity:** (+) low sensitivity (the indicator has very limited response when changes occur in the variable to be measured and can be influenced by a lot of external factors); (++) sensitive (the indicator fully responsive to the changes in the variable to be measured and is not influenced by external factors).

**Availability:** (+) limited availability (it is difficult to collect/update regularly, due to calculation method, source etc.) (++) available (does not pose any difficulties for collection/update)

**Cost:** (+) high costs (specific studies, surveys at MA/ACIS etc.), (++) low cost (no additional costs for collection, other than regular reporting requirements and input into the electronic system)

Comments have been made in relation to each of the above issues. The analysis of the individual indicators output and result indicators of SOP ENV can be found in **ANNEX II**.





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## 4. RECOMMENDATIONS

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### 4.1. NEEDS ASSESSMENT

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1. In respect to the appropriateness and the actual use of indicators, the knowledge base at the level of the MA is currently limited; **therefore, it is recommended that training and instructions specifically designed for working with indicators be provided through additional TA.**
2. The survey also highlighted the need for training and instructions in respect to using indicators; therefore, **it is recommended that training and instructions specifically designed for working with indicators be provided through additional TA.**
3. Proper instructions for using indicators are also necessary, for ensuring a proper causal link between different levels of monitoring: project, programme and NSRF; **it is recommended that a common set of rules and procedures be set-up, under ACIS coordination.**
4. In order to have a complete and accurate image of the progress of the implementation, not only for Technical Assistance, but for all types of interventions, both quantitative and qualitative information is needed. **It is suggested that the Evaluation Plan for SOP ENV include thematic evaluations for assessing the quality of the interventions, such as the value added of the OP on increasing accessibility, the effectiveness of the interventions etc.**
5. There is a clear need for having a definitive list agreed with the European Commission. **Therefore, it is highly advisable that the process of negotiations and defining a final list of indicators for SOP ENV be given priority.**
6. As implementation will progress, more knowledge will be achieved, on all tiers – performance, capacity of beneficiaries, and appropriateness of indicators. The feedback provided by the use of indicator systems should be used for continuous improvement both in terms of policy but also in terms of the indicator system itself. **It is recommended that MA SOP ENV and all relevant stakeholders be actively involved in the process of improving the system of indicators. Also, if the need is identified, the MA should be encouraged to establish and monitor its own set of (sub)indicators.**
7. There is a lack of correlation with other OPs (ROP, SOP HRD and OPTA, for example), for cross-cutting indicators, such as “number of participants”, “length of road” etc. **It is suggested that a common approach be enforced and observed by ACIS in coordination with the respective MAs.**



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## 4.2. ANALYSIS OF THE INDICATORS SYSTEM

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1. It is advisable that **new output and result indicators be introduced to fill the gaps in coverage**. Indicators could be generated for all by an interventions envisaged. However, it is not practical to attach indicators to all of them. It is preferable to concentrate on developing indicators for the more prominent activities only.
2. Given that the European Commission underlines the utility of context indicators and that the need for this type of indicators has precisely resulted from the analysis performed, it is recommended that **context indicators be introduced and properly defined** for SOP ENV. A list is presented in the following tables.
3. As regards matching the core indicators requested by the EC, it is advisable to follow the **existing supplementary indicators, which should be “empowered” as programme indicators**.
4. Balance should also be improved, by **reducing the ratio between output and result indicators**.
5. Manageability should be improved, by **officially adopting the action categories and increasing the use of the equivalent SMIS function**. Also for manageability reasons, consistency should be observed in defining (especially labelling) indicators.
6. For the easiness of implementing the recommendations presented under *Fig. 6 Results of the Overall analysis of the system of indicators and Fig. 3 Final recommended list of indicators for SOP ENV in SMIS*

#### 4.3. LIST OF INDICATORS USED AS PARAMETERS OF SMIS

The recommended list of indicators for SOP Environment is built based on the findings, conclusions and recommendations of all the previous chapters and aims at bringing improvements both at the level of the system and at the level of individual indicators.

FIG. 4 FINAL RECOMMENDED LIST OF INDICATORS OP-TRANSPORT IN SMIS

OUTPUT INDICATORS							
No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
1	*	New and modernised drinking water sources (no.)	No.	200	Drinking water/waste water in regional system	Simple	-
1	200	Treatment plants new and rehabilitated (number)	No.	200	Drinking water/waste water in regional system	Simple	-
	*	New and rehabilitated facilities for the sludge generated in WWTP (no.)	No.	200	Drinking water/waste water in regional system	Simple	-
2	201	Waste water treatment plants new and rehabilitated (number)	No.	200	Drinking water/waste water in regional system	Simple	-
	*	Equipment purchased for metering, laboratory, loss detection, and other uses (no.)	No.	200	Drinking water/waste water in regional system	Simple	-
34	202	Localities benefiting from new and rehabilitated facilities (number)	No.	200	Drinking water/waste water in regional system	Simple	-
35	*	Population equivalent for which waste water is treated according to NTPA 001 (number)	No.	200	Drinking water/waste water in regional system	Simple	(26)
36	204	Additional population connected to water supply services (number)	No.	200	Drinking water/waste water in regional system	Simple	(25)
37	205	Additional population equivalent connected to sewage services (number)	No.	200	Drinking water/waste water in regional	Simple	-

<sup>19</sup> According to Working Document 7

OUTPUT INDICATORS							
No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
					system		
	*	Decrease of losses in the distribution system (%)	%	200	Drinking water/waste water in regional system	Simple	-
	*	New selective collection systems installed (no.)	No.	201	Waste management	Simple	-
	210	New waste management systems (number)	No.	201	Waste management	Simple	-
	*	Quantity of gas recovered from landfills/year (m3)	m3	201	Waste management	Simple	-
	*	New facilities for municipal hazardous waste and other specific categories, including new equipment for municipal waste facilities and other specific categories of waste (no.)	No.	201	Waste management	Simple	-
4	211	Extended waste management systems (number)	No.	201	Waste management	Simple	-
5	212	Waste landfills (old, noncompliant) in rural areas, closed (number)	No.	201	Waste management	Simple	-
6	213	Municipal waste landfills (old) in urban areas, closed (number)	No.	201	Waste management	Simple	-
7	*	Waste projects (no.)	No.	201	Waste management	Simple	-
38	214	Population benefiting from implementation of measures (number)	No.	201	Waste management	Simple	-
	*	Energy generated by the use of biogas (kWh)	No.	201	Waste management	Simple	-
	*	Localities benefiting from new facilities for municipal hazardous waste and other specific categories, including new equipment for municipal waste facilities and other specific categories of waste	No.	201	Waste management	Simple	-
8	215	Rehabilitated area (ha)	Ha.	202	Historically contaminated sites	Simple	
39	*	Rehabilitated area used for public/economic purposes	ha	202	Historically contaminated	Simple	-

OUTPUT INDICATORS							
No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
		(ha)			sites		
9	216	Central heating systems rehabilitated (number)	No.	203	Heating systems	Simple	-
10	*	Number of projects	No.	203	Heating systems	Simple	-
11	*	Studies, analyses, reports, strategies	No.	203	Heating systems	Simple	-
	*	Improved metering, systems (no.)	No.	203	Heating systems	Simple	-
40	218	Localities in which the air quality is improved (number)	No.	203	Heating systems	Simple	-
41	220	Reduction of SO <sub>2</sub> emissions (tones)	t	203	Heating systems	Simple	-
42	221	Reduction of NO <sub>x</sub> emissions (tones)	t	203	Heating systems	Simple	-
43	217	Rehabilitated thermal capacity (MWth)	MWth	203	Heating systems	Simple	-
44	219	Population benefiting from improved air quality (number)	No.	203	Heating systems	Simple	-
45	*	Number of projects	No.	203	Heating systems	Simple	-
	*	Decrease of losses in the distribution system (%)	No.	203	Heating systems	Simple	-
	*	Studies, analyses, reports, strategies (no.)	No.	204	Nature conservation	Simple	-
	222	Proposed sites in Natura 2000 network benefiting from measures implementation (number)	No.	204	Nature conservation	Simple	-
	*	Restored landscape (km)	No.	204	Nature conservation	Simple	-
13	223	Habitats ecologically rehabilitated (number)	No.	204	Nature conservation	Simple	-
	*	Purchased land with significant value in terms of biodiversity becoming public property (ha)	Ha	204	Nature conservation	Simple	-
14	*	Participants at events organised (number)	No.	204	Nature conservation	Simple	-
15	*	Information and publicity materials (number)	No.	204	Nature conservation	Simple	-
16	*	Extended IT systems (number)	No.	204	Nature conservation	Simple	-
17	*	Participant training days – beneficiaries (number)	No.	204	Nature	Simple	-

OUTPUT INDICATORS							
No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
					conservation		
18	*	Participant training days – other structures (number)	No.	204	Nature conservation	Simple	-
19	*	Management plans elaborated/ revised (number)	No.	204	Nature conservation	Simple	-
20	*	Purchased land with significant value in terms of biodiversity becoming public property (ha)	Ha.	204	Nature conservation	Simple	-
46	225	Surface of protected areas and Natura 2000 sites benefiting from measures implementation (ha)	ha	204	Nature conservation	Simple	-
47	224	Management plans implemented (number)	No.	204	Nature conservation	Simple	-
	*	Species protected (no.)	No.	204	Nature conservation	Simple	-
48	*	Population awareness level (%)	%	204	Nature conservation	Simple	-
21	226	Protected area through protection works against floods risk (km <sup>2</sup> )	Km <sup>2</sup>	205	Natural risk prevention	Simple	-
22	*	Projects for natural risks prevention (number)	No.	205	Natural risk prevention	Simple	-
49	*	Reduction of incidence to floods risk (%)	%	205	Natural risks prevention	Simple	-
50	*	Population benefiting from floods protection projects (number)	No.	205	Natural risks prevention	Simple	(33)
51	*	Population benefiting from forest fire protection and other protection measures (number)	No.	205	Natural risks prevention	Simple	(34)
23	227	Length of rehabilitated seashore (km)	Km	205	Natural risk prevention	Simple	-
52	228	Extended coast area (km <sup>2</sup> )	Km <sup>2</sup>	205	Natural risks prevention	Simple	-
24	703	Meetings of relevant committees and working-groups (number)	No.	700	Technical assistance	Simple	-
	*	Specific IT applications purchased (no.)	No.	700	Technical assistance	Simple	-
25	704	Participant training days	No.	700	Technical assistance	Composed (25) = (26)+(27)+(28)	-



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OUTPUT INDICATORS							
No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
26	705	Participant training days – beneficiaries	No.	700	Technical assistance	Simple	-
27	706	Participant training days – managing structures	No.	700	Technical assistance	Simple	-
28	707	Participant training days – other structures	No.	700	Technical assistance	Simple	-
	*	Temporary staff contracted (man-days)	No.	700	Technical assistance	Simple	-
29	700	Studies, analyses, reports, strategies (number)	No.	700	Technical assistance	Simple Simple	-
30	701	Guidelines and other methodological instruments (number)	No.	700	Technical assistance	Simple	-
31	702	Events focused on experience exchange related to funds implementation and thematic aspects (number)	No.	700	Technical assistance	Simple	-
	*	Total amount of advisory services received (expertise and advice) (man-days)	No.	700	Technical assistance	Simple	-
53	*	Decreased number of irregularities (no.)	No.	700	Technical assistance	Simple	-
	*	Reduced data processing time (hours)	H	700	Technical assistance	Simple	-
	*	Budget allocated to temporary staff (EUR)	EUR	700	Technical assistance	Simple	-
	*	Total amount of advisory services received (expertise and advice) (man-days)	Man-days	700	Technical assistance	Simple	-
54	*	Degree of satisfaction of training participants (%)	%	700	Technical assistance	Simple	-
32	*	Communication Plan designed and implemented (no.)	No.	705	Communication and publicity	Simple	-
	709	Information and publicity materials (number of copies)	No.	705	Communication and publicity	Simple	-
	*	Participants at events organised (number)	No.	705	Communication and publicity	Simple	-
33	710	Mass-media campaigns (number)	No.	705	Communication and publicity	Simple	-
55	*	Information requests answered by the Information	No.	705	Communication	Simple	-



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2007 - 2013

OUTPUT INDICATORS							
No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
		Centre (number)			and publicity		
56	711	Website visits (number)	No.	705	Communication and publicity	Simple	-
57	*	Population awareness level (%)	%	705	Communication and publicity	Simple	-
	*	Population equivalent for which waste water is treated according to NTPA 001 (no.)	No.	*	*	Simple	
	*	Additional population connected to water supply services (no.)	No.	*	*	Simple	
	*	Additional population equivalent connected to sewage services (no.)	No.	*	*	Simple	
	*	Decrease of losses in the distribution system (%)	%	*	*	Simple	
	*	Waste landfills (old, noncompliant) in rural areas (small), closed (no.)	No.	*	*	Simple	
	*	Municipal waste landfills (old) in urban areas, closed (no.)	No.	*	*	Simple	
	*	Population benefiting from implementation of measures – waste management (no.)	No.	*	*	Simple	
	*	Energy generated by the use of biogas (kWh)	kWh	*	*	Simple	
	*	Rehabilitated area – historically contaminated sites (ha)	ha	*	*	Simple	
		NOx emissions (kt)	Kt	*	*	Simple	
		SO2 emissions (kt)	Kt	*	*	Simple	
		Volatile Organic Compounds - VOCs emissions (kt)	Kt	*	*	Simple	
		Particulate Matters - PM10 emissions (kt)	Kt	*	*	Simple	
		Habitats ecologically rehabilitated (no.)	No.	*	*	Simple	
		Species protected (no.)	No.	*	*	Simple	
		Reduction of incidence to floods risk (%)	%	*	*	Simple	
		Population benefiting from measures implementation – natural risks prevention (no.)	No.	*	*	Simple	
		Length of rehabilitated	km	*	*	Simple	





### OUTPUT INDICATORS

No.	Code SMIS	Indicator	UM	AC code	Action Category	Type	Core indicator <sup>19</sup>
		seashore – natural risks prevention (km)					