

*THE ENVIRONMENTAL
RESEARCH IN MONTENEGRO*

Podgorica, April 2009

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ABSTRACT

This report is developed in April 2009 in the content of EC funded project WBC-INCO.NET under the WP2 – Priority setting to structure participation in FP.

The report provides a brief overview of the environmental research in Montenegro with the scope to define and set priorities in term of sub-areas of common regional interest for the enhancing of FP participation. It covers the most important issues, themes and sub-themes in environmental research on national land. It is based on the quantitative data analysis, i.e. using existing data undertook by the data collection through the system of questionnaires and enquiry with the research organizations.

The focus is put on the identification of national strengths thus enabling the definition of potential national priorities.

Expert team

Prof. dr Mira Vukčević, Faculty of Metallurgy and Chemical Technology,
University of Montenegro

Prof. dr Dragoljub Blečić, Faculty of Metallurgy and Chemical Technology,
University of Montenegro

1. Montenegrin environmental policy framework

1.1. Environmental national policy

By obtaining of political and national independence Montenegro has undertaken the full ingerencies in environmental policy. The environmental policy, as a part of the overall Montenegrin integration process in relevant international frame, initiates changes in sustainable exploitation and management of natural resources, institutional reforms and the fostering of institutional national capacities, harmonization of national legislative with the European ones and establishing of the implementation mechanisms. Confirmation of the fostering of national capacities and overall national institutional reforms imposes the necessity of the environmental policy integration in the developing processes.

Only recently, Montenegro makes significant efforts in the implementation of the instruments for the integration of environmental policy in sectored policies. Beside that, there is a significant need for the integrated approach of relevant subjects on different level, but with the important role in the reaching of objectives and tasks in the Montenegrin sustainable development.

Without the harmonization of ingerencies and intersectional harmonization, neither legislative nor the institutional organization will function with the full capacity. Coordinated institutional functioning followed by the adequate statistical cover will enable the full identification of the development possibilities.

1.2. Policy framework in environmental research

The most important institutions that are in charge for the environmental research and legislation are Montenegrin Academy of Science and Arts, University of Montenegro, research institutes and some other public institutions. One of the most important documents that define research priorities, motivate and monitor area of the science and research is Strategy on scientific – research activities which is adopted in June 2008 and should be implemented during the period of eight years.

The other important document is the Strategy of sustainable development adopted in March of 2007. Both of the documents focus the environmental research and sustainable policy as one of the basic priorities on the way of the knowledge-based society creation.

The Ministry of Education and Science is responsible for overall scientific policy in Montenegro. In 2005 Montenegro introduced Law on Scientific-Research Activities (Official Gazette No. 71/05) as a most regulative document in the area of research. According to the Law Montenegro has established a body National

Council for Scientific-Research Activities and prepared aforementioned Strategy with the aim to define annual budgetary increase, as a % of GDP allocated to RTD.

The higher education reform has the main objectives to foster research orientation of University, prevent a brain-drain process and enable a full participation in ongoing mobility schemes.

The Ministry of Tourism and Environment is responsible for overall environmental policy in Montenegro and the body that recently has started to regulate environmental legislation and to harmonize it with the European Commission directives in the field.

The fields that are covered by the legislative documents are:

- Law on Spatial Planning and Building of Objects (Official Gazette 51/08)
- Law on Environment Protection (OG 48/08)
- Law on Strategic Environmental Impact Assessment (OG 80/05)
- Law on Environmental Impact Assessment (OG 80/05)
- Law on Integrated Pollution Prevention and Control (OG 80/05)
- Law on Waters (OG 27/07)
- Law on Waste Management (OG 80/05)
- Law on Air Pollution Protection (OG 14/80, 16/80, 27/94)
- Law on Environmental Noise Protection (OG 45/06)
- Law on Communal Activity (OG 12/95)
- Rulebook on the Contents of the Environmental Impact Assessment Analysis (OG 14/07)
- Rulebook on the Quality and Sanitary-Technical Conditions for Release of Waster Waters in the Recipient and Public Sewage, manner and procedure of waster water quality investigation, the minimal number of investigations and the content of the report on waste waters quality (OG 45/08)
- Rulebook on Allowed Concentrations of Hazardous Substances in the Air (OG 4/82, 8/82)
- Rulebook on Emission of Air Polluting Substances (OG 25/01)

The Academy of Science and Arts of Montenegro was constituted in 1973. Today it is the supreme institution in the field of Sciences and Arts in Montenegro.

The University of Montenegro (founded in 1974) consists of seventeen faculties, three scientific institutes and University Library. It is the only one that deals with the environmental research standards and guidelines for accreditation of study programs and HEI in line with QA standards and guidelines in EHEA were adopted by the National Council for Higher Education on February 15 2007.

Environmental research is very dispersed among the different faculties of the University that often deals with the same problems with different approach. Unfortunately there is not a lot of evidences of interdepartmental research activities within the University. The faculties that perform environmental research and educational activities are:

- Faculty of Natural Sciences (Department of Biology and Physics)
- Faculty of Metallurgy and Chemical Technology, department of environmental protection
- Biotechnical Faculty
- Faculty of Civil Engineering

One of the three scientific institutes within the University is the Institute of Marine Biology (founded in 1961) is the only institution in Montenegro for scientific investigation, exploitation, control and protection of the sea and coastal zone.

There are also some public institutions performing the environmental research, monitoring and prevention, among them:

- Centre for Eco-toxicological Research which is responsible for monitoring of air, water and soil pollution, emission measurement, monitoring of the surface, underground and marine water's quality, toxicological investigation of biological material, food and feed control, radio ecological investigation, radon monitoring, noise and vibration monitoring.
- Bureau for environmental protection
- National parks of Montenegro dealing with several national parks and natural resources in Montenegro
- Hydro-meteorological bureau, the only institution of that type in Montenegro.

1.3. Economic data for environmental sector

1.3.1. Financing of scientific-research activity

Creation of European Research Area implies standardized methodology for monitoring the stake in this area in all EU countries and the candidate countries. OECD methodology of statistical research related to science and technological research has been widely accepted so as to have comparable data among the states and plan the growth of each country separately in compliance with the Lisbon strategy and Barcelona objectives.

Montenegro should start investing more appropriate scale of budget funds into research and technological development, because the scale of investment into this area so far was insufficient in comparison with the norms of the community we aspire to.

Previous investments should not be justified by the fact that we are a small and poor country, because the indicator of “% of GDP for S&T” is equally “heavy” for every country, and it speaks about the efforts of a country in the creation of new knowledge and represents one of the most important drivers of economic growth.

According to the existing available data being collected by MONSTAT, we can obtain some data from two categories of indicators: Investment into scientific-research activity and Monitoring of those employed in science.

We remind that MONSTAT does not have a data collection methodology harmonized with that of EU, but works according to the old, UNESCO methodology, which was applied as far back as in former SFRY. Moreover, even the existing data include a certain degree of unreliability due to insufficiently developed awareness of how important accurate filling in of statistic surveys is.

On the other side, Ministry of Education and Science has not innovated the procedures and standards for licensing scientific-research institutions and registration into the Register, accordingly there is no red picture of the degree of the institutional involvement in RTD.

A set of tables will represent the situation of the scientific-research funds allocation through the Ministry of Education and Science as the key institution for the distribution the investment in overall research activities.

Table 1 includes the following data:

- a. funds allocated from the state budget for S&T, as % of GDP
- b. total spending on RTD, as % of GDP

Table 1. Data on investments into GDP (1.)

Year	GBAORD				GERD			
	MN	EU-25	Max	Min	MN	EU-25	Max	Min
2002	0,06				0,14			
2003	0,05				0,08			
2004	0,08				0,18			
2005	0,03	0,74	1,5	0,09	0,16	1,86	3,7	0,37
2006	0,03				0,04			

Table 2. Review of funds allocated for science from the Budget over the Ministry of Education and Science for the period 1997-2004 (2.)

Year	1997	1998	1999	2000	2001	2002	2003	2004
% of budget	0,42	0,75	0,74	0,60	0,82	0,69	0,33	0,30
% of realization	0,27	0,33	0,26	0,26	0,29	0,40	0,29	0,30

1. Data on GDP 2002-2006 are the official data of Monstat; data no spending on S&T in Montenegro are the data of Monstat, they, however, include only research in the higher education sector (financial from the state budget, private companies or other sources); Data on investments into S&T in EU countries are data of Eurostat (Eurostat, R&D Statistics – OECD MSTI 2006)
2. Source: Ministry of Education and Science

Table 3. Review of distribution of funds of the Ministry of Education and Science for the period 2005-2007 (3.)

Year	Total €	NI projects (equipment)	NI professional development	International cooperation
2005	722 000	47,00%	46,40%	6,60%
2006	600 000	57,16%	27,67%	15,17%
2007	900 000	57,78%	22,00%	20,22%
2008	1 591 000	83,10%	13,20%	3,70%

1.3.2. Scope of financing

Montenegro cannot set to itself the objective of following the EU and allocating 3% of GDP for science by 2010, but it can make various hypothetical projections in order to analyze the severness of the problem and chose the variant which is the most acceptable and the most realistic. According to some predictions for the Region, it is possible to allocate a minimum of 1% for S&T until 2011. One should be realistic and notice that allocation of 1% in 2011 will be difficult to realize.

For the time being, until the economy of the country grows stronger, until a more intensive investment cycle begins, until sound production capacities and their relation to the services sector take a more definite shape, intensive state measures will be needed to support research and technological development and innovations. After that it will be only natural to expect higher allocations of economy, and in particular of the private sector which must find its interest in allocation for scientific-research activity, and accordingly to invest into the project dealing with the environmental protection within the total funds that Ministry of Education and Science has allocated to finance scientific-research projects (2005-2008) (Table 4.), the part that can be considered as the funding of the environmental projects was 285.569 E or 11,321. ^(4.)

The overview of the total funds allocated to the scientific-research projects, and especially environmental projects is presented in table 4.

3. Source: Ministry of Education and Science

4. Source: Ministry of Education and Science

Table 4. Overview of the total funds allocated to the scientific-research projects, and environmental projects

	2005	2006	2007	2008
Scientific-research project – total funds (€)	339.340	342.960	520.020	1.322.000
Environmental projects (€)	67.072	67.072	34.740	116.985
%	19,77	19,56	9,68	8,85

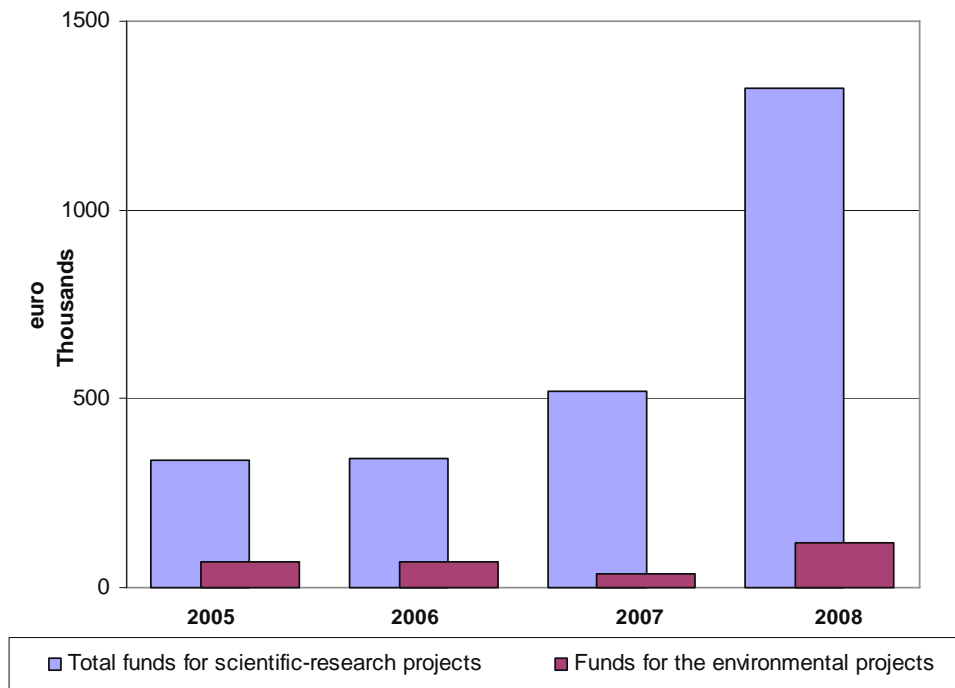


Figure 1. Total funds for SR projects and environmental projects in period 2005-2008

Strategy for scientific-research activities of Montenegro (adopted June 2008) predicts a certain growth of investment into the SRA by 2013 (Fig. 2) which predicts the SRA investment of 1,4% GDP with the public participation of 0,8%. That means that also the industry and private sector even in the environmental protection should finance much more then now.

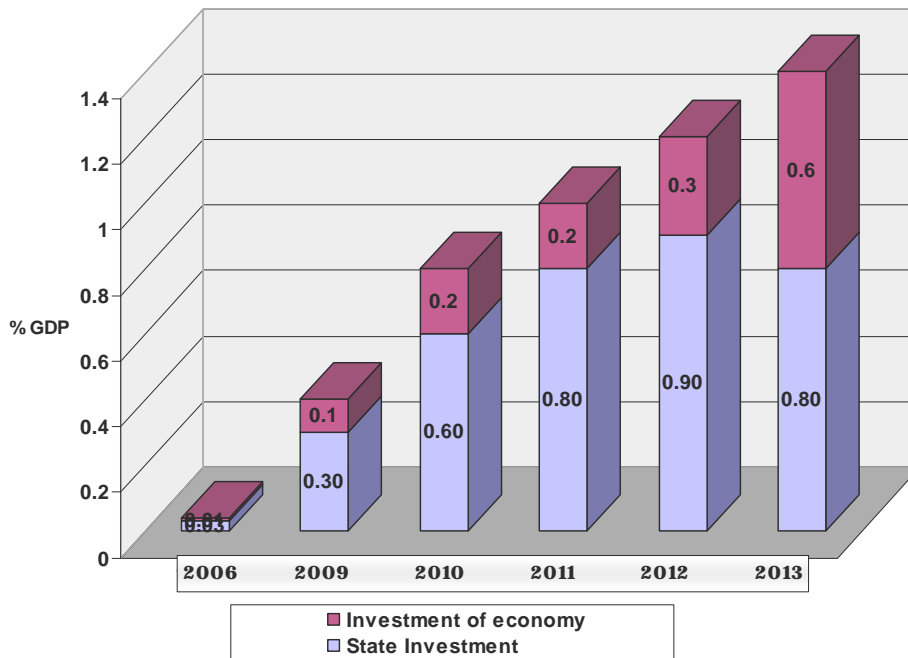


Figure 2. Proposal for growth of investment into SRA by 2013 (5)

Financing of the environmental research was performed not only under the umbrella of Ministry of Education and Science, but also through the funds available within the Ministry of Tourism and Environmental Protection.

Because of the changed structure of the Ministry, data are not fully available within the former Ministry of environmental protection and urban planning; there are only available data for 2006. This year was the only one where the Governmental spendings were separated and classified according to the adequate Governmental function.

The overall governmental spendings on environmental protection were 0,75% from the overall spendings e.g. 0,2% of GDP. About 40% for these costs were covered by the sectoral budget of environmental protection.

Table 5. Budget of the environmental sector in former Ministry of environmental protection and urban planning in period 2002-2006 (mil €)

Environmental sector	2002	2003	2004	2005	2006
Overall incomes	0,829	1,114	0,766		1,500
Overall outcomes	1,007	1,279	0,866	1,082	1,600
% from the total governmental spendings	0,1	0,1	0,1	0,1	0,1

Environmental investment of the present Ministry of Tourism and Environmental Protection are at the level less than 0,1% of GDP.

Table 6. Actual budget of the Ministry of Tourism and Environmental Protection (mil €)

	2006	2007	2008
Budget of the Ministry	2,600	1,800	5,300
Costs on materials and services	1,51	1,53	5,50^(6.)

Budget for 2009 for the all capital projects (excluded the projects about the plant for the waste waters treatment, building of the headquarters for the Environmental Agency and Integrated management of Skadar Lake) is 9.600.000 €.

Strategic master plan for the management of solid waste predicts the investment of about 62.000.000 € in period 2005-2009, waste waters treatment in Cetinje region of about 28.000.000 € in period 2004-2008.

6. The number for 2008 is the projection. No data available yet.

2. Institutional structure

2.1. Research infrastructure

For the time being there are no institutions in Montenegro dealing exclusively with the environmental research. According to the new trends and obligations of Montenegro within the environmental frame, some of the research institutions have started with some aspects of environmental research.

The infrastructural level varies from institution to institution e.g. better research performing and human capacities go along with the higher education and research while the everyday monitoring is basically performed in the public institutions and institutes dominantly market-oriented. University of Montenegro has good scientific-research capacities in environmental field and deals with the variety of research activities like making the studies about the environmental impact assessment, dealing with the environmental management plans, development of models, data bases and software, projects and programs for the flora and fauna protection, marine and coastal protection, biodiversity and climate change mitigation, cleaner production, energy efficiency.

Public institutions, often well equipped, deal dominantly with the environmental monitoring and measurement, production's quality control, quality of air, water and soil, examination of working conditions, etc.

2.2. Human resources

The number of employees in scientific-research institutions and institutes in period of 2005-2007 is presented on Table7.

Table7. The overall number of employees in scientific-research organization, the number of researchers with the academic position and titles and number of research assistants (7.)

YEAR	The overall number of employees	Researchers with academic position	Research assistants
2005	1246	633	241
2006	1233	602	282
2007	1344	671	276

7. Source: Monstat

The most of the researchers are employed at the University of Montenegro.

Table8. The breakdown of the researchers' position through the period of time 2005-2007

YEAR	The overall number of researchers	Researchers at the University	%	Researchers at the institutes	%	Researchers in public institutions	%
2005	633	521	82,3	86	13,6	26	4,1
2006	602	486	80,7	89	14,8	27	4,5
2007	671	556	82,9	82	12,2	33	4,9

There are no precise data about the number of researchers dealing with the environmental research. They have been presented among the faculties like Faculty of Natural Sciences, Civil Engineering, Metallurgy and Chemical Technology, Medicine, etc.

Although there is very limited number of statistical data, a kind of analysis can be made based on the number of the researchers and research assistants participating in the realization of the projects with the environmental content funded by the Ministry of Education and Sciences.

Data from 2008 operate with the 16 PhDs, scientific researchers and 12 masters, means less than 5% of the overall number of researchers in Montenegro.

This number should be enlarged by the figures of researchers which participated in environmental programs with the industrial subjects.

The exact data about the published papers in environmental field among the researchers in Montenegro are not available.

3. Programs and projects in environmental research sector

3.1 Projects and programs on National level

Considering the great importance of the environmental issue, funds allocated by the Ministry of Education and Science and Ministry of Tourism and Environmental protection are not sufficient to cover most of the sub-themes. On the other side there are no developed national human resources for the specialized environmental research, Ministry of Education and Science, through the wide-research national call, finance also the environmental research and projects. Statistically these projects can not be followed separately, but within the natural sciences and engineering,

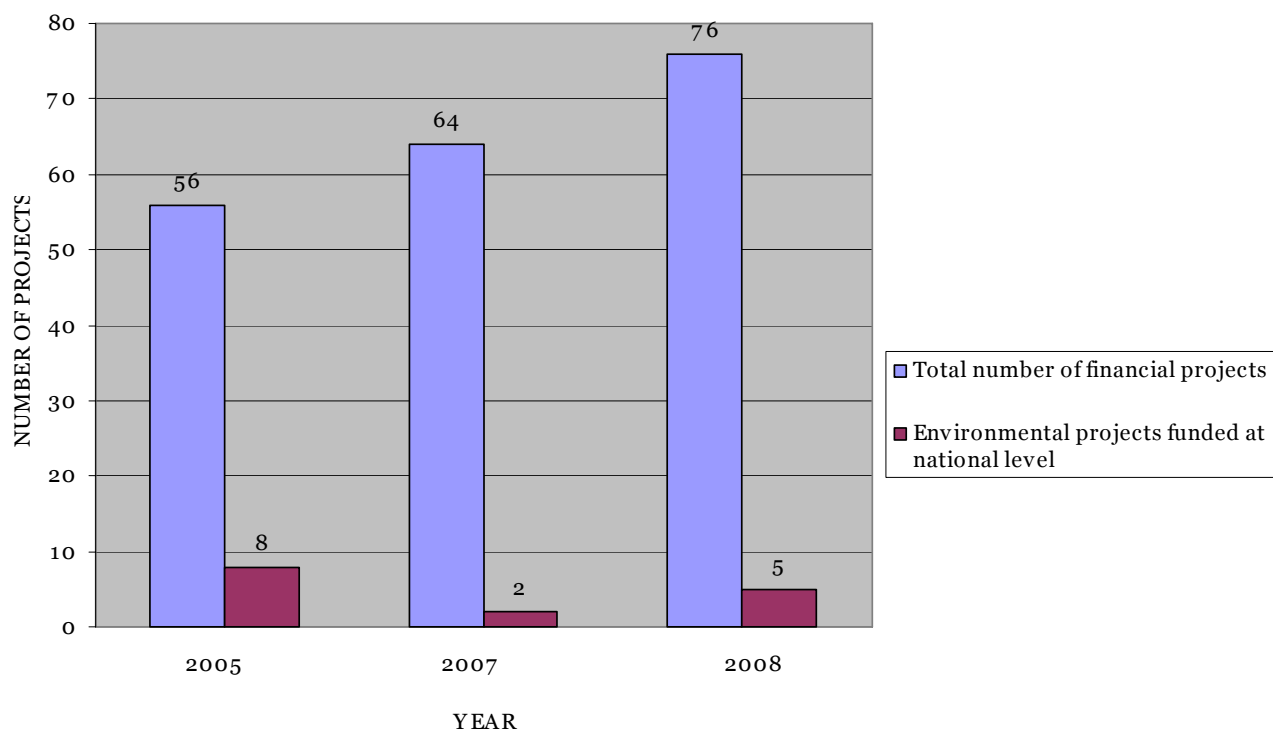


Figure 3. Ration between the overall number of nationally funded projects and funded environmental projects

Data presents the situation that the percentage of environmental project funded at national level decline from 19,3% in 2005 to 6,5% in 2008.

The total number of environmental projects funded at national level in the period 2005-2008 is 16. These were dominantly two-year or three-year projects.

Most of the projects cover the research on the marine and coastal protection, as well as protection of Skadar Lake and the influence of different sediments on the quality of flora and fauna. Some of the technologically oriented projects were also present like the project dealing with the research on the possibility of industrial waste valorization.

All of the projects were performed at the University of Montenegro.

There are no valid data from the Ministry of Tourism and Environmental Protection about the number of funded projects at national level.

According to the data obtained from the University of Montenegro and Governmental institutions, it can be concluded that aforementioned Ministry has funded the projects dealing with monitoring of Montenegrin biodiversity, coastal protection, marine research, water, soil and air quality.

In 2009, through the international funding, Ministry of Tourism and Environmental Protection will finance the projects about dumps, integrated management of Skadar Lake ecosystem, and treatment of waste waters.

3.2. Financing by the instruments of pre-accession to EU (IPA-funds)

Activities are implemented through five components among which the two are eligible for Montenegro:

- Support for the transition and institutional fostering
- Regional and cross-border cooperation

For 2008 several projects have been delegated in the coordination with European Agency for Reconstruction and Montenegrin Secretariat for European integration. In the first eligible component some of the projects have been delegated, dominantly dealing with the fostering of capacities in the implementation of Law of strategic assessment on environmental impact and Law on integrated pollution control.

- Fostering the capacities in industrial sector
- Fostering the capacities for the establishing of the protected areas network NATURA 2000.

The infrastructural projects are mainly in the field of the establishment for the waste waters treatment in Nikšić and recently Bijelo Polje.

Within the second component of cross border cooperation there have been made some situation analysis of economical, cultural, demographical, ecological and technological potential for the four cross-border territories: with Croatia, BiH, Serbia and Albania. After the cross-border program preparing projects in the local/regional level are expected. The total expected sum for both components in two years is about 2.000.000 €.

From 2008 Montenegro has received a significant financial support for the environmental sector. From 2001 the EU support to Montenegrin Development was enabled through the EU program for the reconstruction, development and stabilization (CARDS). For the period 2002-2006 the real and projected support for the environmental projects was about 11,5 mil €. It was focused on the developmental projects in the domain of waste waters treatment, management of solid waste, preparing and development of environmental laws and development of strategies (water, air, soil), fostering of administrative capacities.

Table9. CARDS funds in Montenegro in period 2002-2006 (8.)

Year	Project	Environmental CARDS investment	Total investment
2002	Treatment of waste waters	1,7 mil €	12,0 mil €
2003	Solid waste management	2,7 mil €	12 mil €
2004	Investment in infrastructure	3 mil €	22,5 mil €
2005	Plant for waste waters treatment	1,6 mil €	18,5 mil €
2006	Environmental Agency	1	

3.3. Programs of bilateral cooperation in the environmental field

International environmental cooperation of Montenegro is characterized by the intensive bilateral activity.

Bilateral environmental cooperation is predominantly realized under the umbrella of Ministry of tourism and environmental protection. The smaller part is realized through the activities of Ministry of Education and Science.

As the result of bilateral cooperation in 2007 and 2008 Ministry of Tourism and Environmental Protection has signed contracts for 15 projects with 8 European countries. (9.)

The projects have covered several sub-themes as follows:

- Environmental management, especially in the coastal zone of Adriatic sea, and region of Skadar Lake,
- Harmonization of national environmental activities with the EU directives,
- Strategic assessment of environmental impact,
- Physical and spatial planning,
- Projects of dumps development,
- Information system in environmental protection.

Bilateral cooperation is especially active within the region of WBC through the various regional initiatives or Memorandums of understanding.

8. Source: European Agency for Reconstruction – annual action program

9. Source: Ministry of Tourism and Environmental Protection

For the realization of bilateral projects funding of 16.787.000 € has been allocated. ^(10.)

Among these funds Montenegrin Government has allocated 3.300.000 € for bilateral activities in 2007 and 2008. ^(11.)

Realization of most of the projects is already active. There are no valid data about the spent money up to now.

Bilateral environmental cooperation under the umbrella of Ministry of Education and Science is concretized only with the Republic of Slovenia.

In the table 10 is presented the number of projects under the contracts in 2007 and 2008.

Table 10. Number of bilateral projects of Ministry of Education and Science in period 2005-2007. ^(12.)

Year	2004/05	2005/06	2006/07
Number of projects	6	2	7

Just 1 out of 15 agreed bilateral projects, according to its content, could be defined as the environmental one.

The funds per project are extremely low, in the range of 500-600 €.

3.4. Cooperation with relevant international organizations (GEF, UNEP, UNDP, UNIDO, UNECE, UNESCO, IAEA, UNCSD)

Environmental protection is one of the most important segments in the international frame on different levels. Applying of the mechanisms eligible in the environmental field is the significant measure for the reform of national institutional and legislative frame.

Most important environmental activities are carrying out under the UN umbrella. Because of that the association and active participation in UN agencies activities and bodies is of the utmost importance for the fostering of national capacities and adopting of international standards.

10. Source: Ministry of Tourism and Environmental Protection

11. Source: Ministry of Tourism and Environmental Protection

12. Source: Ministry of Education and Science

Montenegro participates and benefit the funds and projects from the following organizations:

- Global Environmental Fond (GEF)
- United Nations Environmental program (UNEP)
- United Nations Development Program (UNDP)
- United Nations Economic Commission for Europe (UNECE)
- United Nations Commission for Sustainable Development
- United Nations Industrial Development Organization

The contact point from the Montenegrin part for this kind of cooperation is Ministry of Tourism and Environmental Protection.

One of the most prominent projects were carried out and funded by GEF, like: Biodiversity issues, Climate change, International waters issue, Soil degradation, persistent organic pollutants (POPs).

From the GEF funds through UNEP (where Montenegro has the right to participate on the meetings of Global Forum of environmental ministers) one project has been funded by investing of 150 000 USD.

Within the cluster for economy and environmental protection UNDP office in Montenegro works on reaching of sustainable economical development. Some of the realized activities were in the field of tourism and economy climate changes, establishing of geographical information system, remediation of ecological hot spots.

Two projects were funded by GEF funds through this agency in the range of 179.612 USD. In 2008 three more projects were agreed in the range of 4.483.393 USD.

World bank finances the projects in range of 7.000.000 USD for the building of regional sanitary dumps.

UNIDO has performed the preliminary phase of the Program for cleaner production which should be followed by the National center for cleaner production development.

Montenegro participates in great number of regional and national projects approved by the International agency for atomic energy. The implementation organizations from the Montenegrin side were Ministry of Tourism and Environmental Protection, Ministry of Public Health and Social issues, Ecotoxicological Center, Clinical Complex in Podgorica, University of Montenegro.

Program of technical cooperation with Montenegro was approved for the two-year period, covers three national projects out of which two environmental, Montenegrin institutions participate in 7 interregional and 35 regional projects of IAEA.

Through the regional initiative under the UNEP/MAP four small projects were realized in the field of marine environmental protection and coastal protection and management in the range of 1.430.000 €.

The most significant part of international cooperation are credit funds issued by KFW and EIB in the range of 100.000.000 €.

The available data can not offer the information about the ratio between the contracted and realized funds.

4. Major environmental research areas in Montenegro according to the main findings and future needs - areas recommended

In the context of regional and sub-regional development it is very important that Montenegro participates in the following organizations:

- European Agency for Reconstruction (EAR)
- European Environmental Agency (EEA)
- Mediterranean Action Plan (MAP)
- Regional Environmental Centre (REC)

And regional initiatives:

- Adriatic – Ionian initiative
- Central – European initiative

All the data coming from the funding of national research, eligible infrastructure and research activities coming from the international and regional – sub-regional programs, focus some of the priorities in the context of biodiversity, cross-border ecosystems, climate change, marine ecosystems.

Some of the activities are already carried out in the aforementioned fields as well as a problem of soil degradation, persistent organic pollutants (POPs), sustainable forest management, sustainable management of chemicals.

Future priorities can also be defined in the frame of:

- Cross-border ecosystems management
- Water management (lakes and rivers)
- Management and protection of marine eco-systems
- Climate change
- Biodiversity
- Persistent organic pollutants
- Cleaner production
- Sustainable management of chemicals

4.1. SWOT analysis of the environmental research in Montenegro

Strengths

- Proper development of education and learning in all 3 cycles of higher education
- Progressively growing demands for the harmonization with the EU directives
- Progressive extension of available funds and donations
- Government commitment toward the establishing of the conditions for environmental research
- Growing of financing of environmental projects
- Current structure of institutional set-up
- Existing of legislative and national bodies dealing with the RTD

Weaknesses

- Lack of legislation and inefficient existing legislation
- Lack of financial resources for equipment renewal
- Low number of research projects and publications
- Lack of national standards in accreditation of RTD institutions
- Lack of the efficient intersectoral links and policies
- Motivation of young scientists

Opportunities

- Increasing of national and international funding
- Increasing awareness of the position of environmental issues in overall economic development
- Increased scientific support to the policy makers
- Increased knowledge transfer between academia and industrial sector
- Increased frequency of academic mobility
- Increasing networking opportunities

Threats

- Lack of specialized experienced researchers
- Drop behind in the process of EU integration
- Significant ratio between applied and basic research
- Undefined competences among the public and research institutions.

CONCLUSIONS

With all already defined themes and sub-themes there is a lot of potential for the all kinds of cooperation especially on regional level with the same kind of heritage, geographical and environmental similarities as well as the same problems and lack of funding.

The adequate increase of investment should go along with the popularization of environmental research in general at all levels of public apparatus and academia as well with the adequate statistical follow up.