



226517 E-URAL CSA-SA

E-URAL

European Union and Russia Link for S&T co-operation in the area of the environment

Support Action in "Environment (including climate change)"

Start date of project: 1st August 2009

Duration: 2 years

Conclusions on Russian research needs in Environment Theme

Identification of research needs in Russia in the field of FP7 Environment theme contributes to the achievement of one of the project objectives that is to map the niches of excellence existing in Russia relevant to the thematic priorities in the field of environment spread across FP7 Themes and to contribute to identification of environmental research topics of interest, supporting road-mapping of activities in this field of research in the context of FP7 priorities evolution.

To publish and make available the results will contribute to increase the establishment of more sustainable partnerships.

The identification of research needs in Russia has been realized by analyzing the data obtained from the following sources:

- Information gained through **questionnaires** (developed in the frame of E-URAL Work Package 2) from leading Russian experts and scientists specializing in the field of the environment and relevant stakeholders. The questionnaire was sent to about 900 contacts from All Russian Federal Districts - Centre, Far-East, South, Northwest, Siberia, Ural and Volga – which include 79 regional centres and large cities. Dissemination schedule consisted of three blocks: July 2010, February 2011, and July 2011. The total number of questionnaires received from Russian researchers and stakeholders is 336.
- Plans and annual scientific reports of Institutes of Russian Academy of Sciences (including Medical and Agricultural Academies) in the field of environment.
- Plans and annual scientific reports of research groups in the field of environment from Russian State Universities and State Research Institutions
- Priority research lines defined in government documents and Federal target programmes.

The survey shows that the whole range of environmental research is currently being implemented in Russia.

From the analysis of collected questionnaires, it results that the majority of research activities on environmental themes of Russian research institutes and university research groups focuses on the areas 6.1 «Climate Change, pollution and risks» and 6.3 «Environmental technologies». The distribution of research work priorities of institutions are presented in percentage in a table below.

№	Research areas according FP7 Environment Work Programme	Percentage ratio
1	6.3.1 Environmental technologies for observation, simulation, prevention, mitigation, adaptation, remediation and restoration of the natural and man-made environment	30%
2	6.2.1 Conservation and sustainable management of natural and man-made resources and biodiversity	22%
3	6.1.1 Pressures on environment and climate	16%
4	6.1.3 Natural Hazards	12%
5	6.1.2 Environment and health	7%
6	6.4.2 Forecasting methods and assessment tools for sustainable development taking into account differing scales of observation	4%
7	6.3.3 Technology assessment, verification and testing	3%
8	6.4.1 Earth and ocean observation systems and monitoring methods for the environment and sustainable development	3%
9	6.3.2 Protection, conservation and enhancement of cultural heritage, including human habitat	2%
10	6.2.2 Management of marine environments	1%

The Work Programme 2012 has been designed to support the implementation of the Innovation Union initiative and in particular to bring together research and innovation to address major challenges. The 2012 Environment (including Climate Change) Work Programme, under the heading 'Transformative and Responsible Innovation', will respond to global societal challenges in the framework of resource efficiency and climate resilience. The WP's objectives are addressed through five challenges which are forming the key research priorities for the 2012. So it constitutes a significant change in comparison with the approach adopted in earlier work programmes.

However, the challenges are closely linked and integrate the various sub-activities of the Environment (including Climate Change) Theme.

Taking into account the actuality of new Work Programme in Environment the research needs are assessed and distributed according to the current WP2012. The most interesting and significant research areas and particular topics for Russian research community active in environmental research are included in the list below. They are presented according to the principle of general-to-specific.

Challenge 6.1 Coping with climate change

Pressures on environment and climate

- Budgets of global pollutants (carbon cycle - greenhouse gas, mercury, isoprene etc.)
 - Bio-indication of climatic changes in Russia including natural climate cycles' dynamics, carbon cycle dynamics, and anthropogenic influence on the Central forest-steppe
 - Implementation and replication of technologies for processing solid waste containing mercury
 - Mercury as global pollutant
- Climate change impacts at permafrost conditions
 - Permafrost Fate in North Eurasia
 - Climate Changes Influence on Permafrost Landscapes
- Response strategies: adaptation, mitigation, environmental legislation and policies
- Hydrometeorological extremes in changing climate and adaptation to them
- Regional climate change in Siberia – from local to global consequences

Environment and health

- System analysis of multifactorial health effects among population resided in environmentally unfavourable areas
 - Estimation of ecological consequences of global climatic changes and risk for health of the population of industrially developed cities

Future and past climate; reconstruction of climate changes from natural archives (ice core, bed sediments, tree rings, peat-mires and etc.)

- Obtaining high-resolution millennial scale paleo-records from natural archives in Siberia for predicting future climate change

Earth and ocean observation systems and monitoring methods

- Investigation, monitoring and forecast of cryosphere state, and variations in cryogenic conditions
- Physical and chemical processes in atmosphere; thermodynamics, radiation transport, variations in composition
- Study of atmospheric approach on climate change using remote sensing data over the West Siberia

Challenge 6.2 Sustainable use and management of land and seas

Conservation and sustainable management of natural and man-made resources and biodiversity

- Ecology of communities and organisms
 - Etological mechanisms of animal survival in the anthropogenically transformed environment
 - Analysis of morphogenesis mechanisms in vertebrates and invertebrates, their changeability, dynamics and resistance to anthropogenic impacts
- Biodiversity as buffer
 - Biodiversity of fields of oil and gas development: condition, tendencies, pressures and preserving of priorities
 - Estimation of radionuclides in major components of surface and aquatic ecosystems
 - Spatial-temporal organization (scaling) of aquatic ecosystems of inland waters
 - Reproduction and preservation of forestry gene pool
 - Indication of forest ecosystem conditions and forest stability in the view of climate change and other anthropogenic effects
 - The role of forest ecosystems in climate change
- Assessment of the impact of land, water and forest management on biodiversity, human livelihood and global change at the catchment level of the biomes of northern Eurasia as a contribution to the development of a long-term strategy of sustainable development and climate change mitigation
- Theoretical bases and methods of restoration of soil cover of the urbanized territories

Earth and ocean observation systems and monitoring methods

- The influence of industrial air pollution and global climate change on forest ecosystems; Processing and analyzing of spatial data, including remote sensing data
- Monitoring of air quality and presence of toxic and explosive gases in the air
- Monitoring and estimation of components of environment in urban landscapes

Management of marine environments

- Management of water resources under specific conditions and different impacts
- Study of natural ice and of the dynamics of glaciers as the most important components of water resources
- Ocean biosphere and its role in the formation and evolution of the Earth biosphere, marine ecosystems and their changeability under the influence of natural and anthropogenic factors, extreme cases in marine ecosystems
- Research, modeling, calculation and assessment of impact of long-term and short-term changes of sea level on river estuaries
- Analysis of interactions between marine ecosystems and human activities

Protection, conservation and enhancement of cultural heritage, including human habitat

- Environmental technologies for archeology and landscape shaping

Challenge 6.3 Improving resource efficiency

Environmental technologies

- Waste processing and disposal
 - Production of nanomaterials and adsorbents based on industrial wastes
 - Complex low-waste or waste-free use and utilization of the components of wood biomass, products of its processing and secondary fiber resources
 - Methods of control of sewage sulphate-cellulose industry, defining lignin in sewage, methods of industrial sewage purification

- Use of natural raw materials as environmentally friendly building materials
- New and renewable power sources
- Environment-friendly mining and extraction of natural resources

Forecasting methods and assessment tools

- Assessment and forecasting of resources and condition of lithosphere and biosphere

Challenge 6.4 Protecting citizens from environmental hazards

Natural Hazards

- Risk reduction and mitigation of natural and technological accidents
- A long-term experiment on seismic monitoring in the most seismically active regions of Europe
- The study of the present-day volcanism effect on climate change by the example of North Eurasia
- Assessment of natural and anthropogenic risk factors associated to oil field exploitation

Environment and health

- The complex study of living organism reactions on cellular, sub-cellular and molecular level in conditions of atmospheric air pollution by exhaust-gases of the motor transport

Environmental technologies

- Development of a technique for the operative forecast of seismic and volcanic processes on the basis of the dynamics equation of spontaneous natural processes
- Biogeochemical indication and monitoring, estimation and mitigation of eco-catastrophes; study of processes and development of methods for biota restoration in post-catastrophic periods

Earth and ocean observation systems and monitoring methods

- Development of the concept of complex environmental monitoring including the atmosphere, modeling of climatic and ecological effect of natural disasters
- Development of the concept and methodology for monitoring the surface and aquatic ecosystems nearby large nuclear-fuel plants
- Post-fire satellite monitoring of forests

Forecasting methods and assessment tools

- Long-term prognosis of catastrophic forest fire dangers

Challenge 6.5 Mobilising environmental knowledge for policy, industry and society

Pressures on environment and climate

- Political strategies development: networking strategies to consolidate society and authority efforts to climate change consequences' overcoming
- Frameworks, strategies and processes for landscapes functioning of ecosystems in industrial region characterized by high anthropogenic pressures