

PEER -

**The Partnership for European
Environmental Research**

**Research on
Environment and Health –
Demand and Needs for FP7**

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S Y K E



PEER Members

Total staff: 4500 (41% female)

Total budget: 330 Mio Euro/year

SYKE

Finnish Environment Institute
(Finland)

CEH

Centre for Ecology
and Hydrology
(United Kingdom)

NERI

National
Environmental Research
Institute (Denmark)

ALTERRA

Green World Research Centre
(The Netherlands)

UFZ

Centre for
Environmental Research
(Germany)

CEMAGREF

Centre for Agricultural and
Environmental Engineering
(France)

JRC-IES

Joint Research Centre
Institute for Environment and
Sustainability
(European Commission)



**Future research needs in
environment and health
according to
the PEER position paper**

**PEER comments and proposal for priority
"Environment (including Climate change)":
Examples of important research topics
for the Workprogramme FP7
(15/03/2006)**

Rational for environment and health research

Research on “environment and health” has to cover and combine both areas: the **impact of environmental pollution on human and on ecosystem health.**

Even today the knowledge about the effects of compounds released to the environment is still quite limited for a wide variety of substances and stressors, as well as their resulting impact on human health. The cumulative risk from chemicals, physical factors and other environ. stressors on ecosystems, ecosystem functions and human health is still not thoroughly analysed and understood, and risk assessment methodologies need to be further developed.

Until recently, the methodologies for assessing risk to human health on the one hand and to ecosystem health and ecological integrity on the other hand developed independently. **Research in FP7 should further develop knowledge in the separate sectors, and bring together the different approaches and methodologies from the different sectors, fostering development of comprehensive risk assessment and management tools.**

Suggestion of research themes (I)

- **Development of new tools for human risk assessment**
- **Impact of environmental risk factors on human health**
- **Cumulative risk assessment for ecosystem and human health**
- **Understanding the interrelation between social change, environmental conditions and human health in the cities of an enlarged European Union**
- **Novel approaches and instruments for evaluation, forecasting and management of environmental disease risks**
- **Improving human health by forecasting and management of infectious diseases**
- **Spatially explicit assessment of environmental and human risks of contaminants**

Suggestion of research themes (II)

- **Development of toxicity evaluation procedures**
- **Apply system and functional biology to avoid environmental health risks and protect humans and the environment**
- **Pharmaceuticals, personal care products and household chemicals: a framework to manage the trade-off between benefits to society and environmental health**
- *Threats to ecosystems:* **Ecosystem services and human and environmental health**

The research themes (I)

- **Development of new tools for human risk assessment**
Pathological immune reactions provoke or contribute to most of the environment-associated diseases. Research should be focused to a better understanding of the mechanisms of action underlying environmental-related pathological immune reactions for a better assessment of environmental-related health risks, the characterization of risk factors, the development of novel diagnostic concepts and of new biomarkers with a predictive value for disease development.
- **Impact of environmental risk factors on human health**
By influencing the quality of air, water and soil changing environmental and living conditions impact public health. Risk assessment approaches have to be developed which allow a complex evaluation of the multitude of contributing factors to environment related diseases. Epidemiological studies at the European level should provide the data basis for a risk assessment considering environmental stressors as much as social factors. Especially sensitive groups like children should be regarded.
- **Cumulative risk assessment for ecosystem and human health**
Create a risk-directed European-scale inventory of toxicants affecting aquatic and terrestrial ecosystem health as well as human health for cumulative risk assessment.

The research themes (II)

- **Understanding the interrelation between social change, environmental conditions and human health in the cities of an enlarged European Union**

Research is required which is grounded on urban and regional sociology as well as on health and social systems research. It has to take the diversity of both living and environmental conditions throughout the various European regions into account. The various pathways need to be analysed through which urban social change is affecting environmental health and wellbeing of different social groups as well as of various age groups (social justice and health).

- **Novel approaches and instruments for evaluation, forecasting and management of environmental disease risks**

Innovative epidemiological investigations demand novel techniques to analyse, assess, forecast and manage environmental diseases at the level of the enlarged European Union. Temporal and spatial computational models have to be advanced for health and well being as well as for potential environmental stressors (climate, air pollution, noise, etc.). Emphasis is on modelling low-dose, cumulative, short- and long-term effects of multiple exposures.

The research themes (III)

- **Improving human health by forecasting and management of infectious diseases**

Throughout Europe there is an increased occurrence of viral and bacterial infections. Research on how our life style patterns affect the reservoirs, the ecology and evolution of pathogenic traits in the environment is required, and predictive model(s) for forecasting and managing infectious diseases at the European scale need to be developed.

- **Spatially explicit assessment of environmental and human risks of contaminants**

Spatially explicit risk assessment methods should include geostatistic methods, foraging modelling of ecological receptors and food web interactions for ecological receptors. For human exposure, methods for risk assessment should incorporate human exposure models.

- *Threats to ecosystems:* **Ecosystem services and human and environmental health** Develop an approach to harmonize risk assessment for human and environment health that should be consistent for the setting of environmental targets with respect to sustainable use as well as for environmental remediation targets. Both lines of targeting should include 'suitability for use' criteria with respect to the use the environment.

The research themes (IV)

- **Development of toxicity evaluation procedures**

Risk assessment for hazardous substances is a fundamental undertaking in the protection of human and environmental health. Alternatives to animal experimentation shall be developed for both human and ecotoxicology for a wide range of toxic endpoints, including acute and chronic as well as reproductive toxicity.

- **Apply system and functional biology to avoid environmental health risks and protect humans and the environment**

Standard hazard testing approaches are not applicable to identify adverse impacts since these chemicals – such as pharmaceuticals, personal care products as well as many industrial chemicals - are discharged in very low amounts and their potential risk will be mediated through a long-term low-dose exposure. Sensitive testing strategies able to identify subacute and predict potential long-term effects are required. System biology bears the possibility to integrating genomics, proteomics and metabolomics for the detection of the initial molecular events that can be anticipated for every hazardous chemical.

- **Pharmaceuticals, personal care products and household chemicals: a framework to manage the trade-off between benefits to society and environmental health**