

HENVINET Final Event

Approaching Complexities in Environment and Health,
14-15 April 2010, Brussels
Book of Abstracts

Sonja Grossberndt and Alena Bartonova, Editors

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Preface

The EU FP6 project HENVINET (Health and ENVironment NETwork) was designed under the co-ordination of NILU to support the EU policy making process towards an integrated approach on environmental health. By focussing on the four priority health issues defined by the EU Environment and Health Action Plan (EHAP) 2004-2010 (asthma and allergies, cancer, neurodevelopmental disorders, endocrine disrupting effects), HENVINET aimed on providing a structured information overview. This was carried out by (i) evaluating knowledge on environmental causes related to the relevant health effects, (ii) providing a platform for communication of issues and experiences for the health and environment community (www.henvinet.eu), and (iii) developing information on and evaluation of tools for practitioners (Decision Support Tools).

At the end of its four years' course, HENVINET was organising the final event 'Approaching Complexities in Environment and Health' from 14-15 April 2010 in Brussels, Belgium. The aim of the conference was to provide a platform for sharing methods and experiences and for discussing expectations the health and the environment communities have towards each other.

The presentations were structured into four sessions 'Complexity in environment and health – approaches and experiences', 'HENVINET overview', 'Tools for practice', 'Communication strategies for environment and health', and two workshops 'Environment and health complexities: challenges for the near future', and 'Interaction with the policy field'. Additionally, 28 posters were presented.

This report is part of the HENVINET deliverable D3.9. It provides abstracts of the presentations given at the final event and results from a feedback session.

Further information can be found at www.henvinet.eu or by contacting the project co-ordinator, Dr. Alena Bartonova: alena.bartonova@nilu.no.

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Summary

The HENVINET project (Health and ENVironment NETwork) was designed under the EU 6th FP to support the EU policy making process towards an integrated approach on environmental health.

At the end of a four years' course, a final event was organised from 14.-15.04.2010 at Brussels, Belgium. The overall topic of the conference was 'Approaching complexities in environment and health'. It provided an overview of the challenges people face when dealing with environment and health issues and offered different possible approaches.

The presentations were structured into four sessions 'Complexity in environment and health – approaches and experiences', 'HENVINET overview', 'Tools for practice', 'Communication strategies for environment and health', and two workshops 'Environment and health complexities: challenges for the near future', and 'Interaction with the policy field'. Additionally, 28 posters were presented. One part of the discussion was the use of a voting system in order to receive feedback from the participants about communicating E&H complexities and the use of the HENVINET portal as a tool to do so. The survey results show, that the gap between the scientific and the policy makers' side still is an important issue. Scientific knowledge and results are not disseminated properly to reach the area of policy making in a way that can be integrated into the development of policies because of their complex nature. The results also indicate that the HENVINET Portal is a suitable communication instrument.

The workshop concluded that the portal can help to fill the gap between science and policymaking, if it is maintained and updated both in the content and tools it provides. By this, it would be a valuable addition to E&H policy making.

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1 Introduction

To protect the health of populations and individuals, policies need to integrate both, environmental and health strategies. Good communication strategies are indispensable, not only within the health and environment community, but also between the two sectors and further stakeholders, last but not least decision makers. In order to tackle these complex challenges a number of tools have been developed by the different communities during the last years, and many of them are now available. This includes tools that allow quantification of various relationships, tools for assessing risks and uncertainties and tools for communication. At the end of the four years' course, HENVINET was organising its final event 'Approaching Complexities in Environment and Health' from 14-15 April 2010 in Brussels, Belgium.

The aim of the conference was to provide a platform for sharing methods and experiences and for discussing expectations the health and the environment communities have towards each other.

HENVINET was using the final event also to disseminate the results that have been developed during the course of the project. Interactive causal-diagrams have been created in order to evaluate the existing knowledge and identifying knowledge gaps on cause-effect relationships within specific health related areas. An interactive networking web portal for Environment and Health experts and professionals (www.henvinet.eu) was launched in order to 'bridge the gap' between the environment and health policy community. So far more than 300 participants have registered using this unique opportunity to enter into a dialogue with experts from different Environment and Health areas. The third result is a sophisticated web-based searchable database containing a collection of relevant Decision Support Tools to support practitioners in the environmental health management process. Stakeholder dialogue has been another important aspect of HENVINET. The project was designed to reach a diversity of stakeholders, ranging from health care professionals to policy makers and further decision makers. A special workshop should address different stakeholders to discuss and plan further cooperation between the scientific and policy community.

The focus of the final meeting lay on these aspects:

1. Complexity in environment and health
2. Tools for practice
3. Communication strategies
4. Exchange of knowledge and results with related projects and research initiatives

The meeting discussed how to make research activities and results of environment and health research projects available to decisionmakers. An important issue was how to bridge gaps between data and information in the fields of environment and of health. Besides disseminating HENVINET results, there was enough time for related Environment and Health projects to present their (research) activities and results and to

discuss the development in the harmonisation process between environment and health. The report at hand provides the reader with the abstracts of the oral and poster presentations given, the presentation slides are available at www.henvinet.eu. To protect the health of populations and individuals, policies need to integrate both, environmental and health strategies. Good communication strategies are indispensable, not only within the health and environment community, but also between the two sectors and further stakeholders, last but not least decision makers. In order to tackle these complex challenges a number of tools have been developed by the different communities during the last years, and many of them are now available. This includes tools that allow quantification of various relationships, tools for assessing risks and uncertainties and tools for communication. At the end of the four years' course, HENVINET was organising its final event 'Approaching Complexities in Environment and Health' from 14-15 April 2010 in Brussels, Belgium.

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ORAL PRESENTATIONS

Key note presentation
The complexity of risk assessment and risk management in environmental health:

For whom? And what should we do about it?

Dr Sylvia Medina

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Keywords: Environmental Health; Complexity; Uncertainties; Risk assessment; Risk management; Risk governance; communications strategies.

Most presentations on the complexity of risk assessment and of risk management in environmental health seek to define, understand, analyze and otherwise tackle this daunting subject.

This is because, as scientists, many of us relish the complex nature of our work, with its many interacting, unpredictable, sometimes unforeseeable and often changing factors, providing complex, sometimes contradictory and often hard-to-understand findings.

However, this presentation shifts focus to the fact that science is not a one-way street, a self-contained discipline.

And that science that makes a difference – which is what the science of environmental health ultimately seeks to achieve – is science that serves a need.

This presentation, then, seeks to bring together science and the need it serves. And in this case specifically ask and answer the vexing question, “Complexity in risk assessment and risk management in environmental health – for whom?” And, “How do we manage it?”

The presentation thus talks not just about complexity for scientists but, equally, for the policy makers, the policy influencers, the doctors, the patient organizations, the NGOs, the media and every other group whose needs we scientists serve and who use the information we provide.

It thus addresses the question, “What can we as scientists do to manage complexity in our work?” But also, “How do we as scientists manage complexity for our audiences?”

This presentation, then, seeks to provide an overview of the complexity of risk assessment and of risk management in environmental health and the problems it causes for both scientists and users of the information they produce. And it pulls these various threads together into a coherent whole at the end.

Among other issues, the presentation covers the precautionary principle and the related topics of evidence and causality; the concept of risk governance; and communications strategies. It also makes suggestions for improving risk assessment and risk management by developing new concepts and better methods and tools, and by expanding capabilities.

Acknowledge Funding Source: InVS

**Good Places, Better Health: A Scottish approach on environment and health
policy for
an Ecological Era**

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Keywords: Ecological public health, problem framing, systems, environment

The modern public health era is increasingly characterised as an Era of Ecological Public Health, underpinned by a paradigm that, when it comes to health and wellbeing, everything matters. The physical environment retains great importance amongst the factors which interact to create and destroy health and wellbeing in any era yet current approaches on environment and health can appear narrow, compartmentalised and hazard focussed in the face of public health challenges like the obesity epidemic diminished mental health and wellbeing, a shifting demographic and stubborn social inequity by almost every measure. Recognising the particular health challenges faced in Scotland the Scottish Government have sought to develop new approaches to policy development on environment and health for the ecological era which we believe are capable of dealing better with a complex causal reality, a now accepted psychosocial dimension and the salutogenic potential of place. Good places, Better Health uses a systems-based approach which places great importance on holistic problem framing involving a wide range of stakeholders. Problem framing is the first step in a process which, when applied to particular priority issues, seeks to gather and analyse a much broader range of intelligence to inform policy and action. A particular benefit of the approach is its effectiveness in making more explicit the links between ecological public health and other related challenges around, environmental justice, sustainability, and climate change.

The ERA-ENVHEALTH project
Coordination of national environment and health research programmes – Environment and Health ERA-NET

Mohssine El Kalhoun (a) and Adrienne Pittman (b) on behalf of the ERA-ENVHEALTH partners¹

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Background and Objectives: Reducing uncertainties about the links between environment and health (E&H) and taking action through protection and prevention measures is necessary. For these to be effective, cooperation must be improved and research driven by a common set of priorities. ERA-ENVHEALTH, co-funded by the European Commission under FP7 “Coordination Actions”, enhances European coordination of environment and health research programming.

Methods: The project started in September 2008 with 16 E&H research programmers from 10 countries. To establish sustainable collaboration, an integrated step-by-step approach is implemented to evaluate methods, define priority themes and respond to these through joint activities and transnational calls.

The originality of ERA-ENVHEALTH is that a first call for proposals was launched simultaneously to experiment joint funding and fully assess its implementation.

Results: Better collaboration means avoiding duplication of financial and scientific effort, shared understanding of priority issues, greater access to information and experts, better use of resources to provide answers to common problems and developing common approaches.

After a year, ERA-ENVHEALTH has developed a shared vision and improved exchange of knowledge and expertise between countries through access to data at European level (website, expert and research programme databases). The consortium is analysing the collected data and identifying common research priorities.

Also, a transnational joint call, funded by three partners, was successfully launched on: “*Health vulnerability resulting from future climate change impacts on soil-water ecosystems, land use and water resources at regional scale*” and two projects selected for funding.

Conclusion: ERA-ENVHEALTH will bring dynamism to E&H research in Europe by promoting collaboration and fostering innovative ideas and increase its visibility as a key area. With the development of new programmes and changes to existing ones, the consortium expects an increase in the diversity of disciplines involved in research and in multinational projects.

¹ Agency of the Environment and Energy Control (ADEME), France; Ministry of Ecology, Energy, Sustainable Development and Land Use Planning (MEEDDAT), France; Belgian federal Science Policy Office (BelSPO), Belgium; Federal Public Service Health, Food Chain Safety and Environment (FPS), Belgium; Environmental Protection Agency (EPA), Ireland; Superior Institute for Environmental Protection and Research (ISPRA), Italy; Swedish Environmental Protection Agency (Swedish EPA), Sweden; Ministry for Housing, Spatial Planning and Environment (VROM), The Netherlands; The National Institute for Public Health and the Environment (RIVM), The Netherlands; Public Health Authority of the Slovak Republic (UVZ), Slovak Republic; Environment Agency England and Wales (EA), The UK; Natural Environment Research Council (NERC), The UK; Ministry of Health (MOH), Israel; Federal Environment Agency (UBA), Germany; National Research Council (CNR), Italy.

European Environment and Health Action Plan 2004-2010 - Achievements

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Environment and health information. The ENHIS (WHO-DG SANCO) projects started to collect comparable information on environment and health in the pan-European Region. The CEHIS (JRC-DG INFSO) project identified directions for dynamic data flows between environmental and human health data and proposed how to integrate disparate information into a uniform system. INSPIRE, will create an EU-wide harmonized database with geographical information to support environmental protection policies including health data. INSPIRE Directive Annex III includes "Human health and safety" and work on this data theme started in 2009.

Human Biomonitoring. The Commission has in close collaboration with Member States and experts prepared a pilot project on Human Biomonitoring. The project, COPHES, financed by DG Research kicked-off 1 December 2009 and includes 35 partners in 24 EU countries and Norway.

Health related environment actions: A new Directive on *ambient air quality* and cleaner air for Europe entered in force in June 2008 (2008/50/EC). The *REACH* regulation entered in force in June 2007. The Council (22 December 2009) invited the Commission to assess how and whether relevant Community Legislation adequately *addresses risks exposure to chemicals from multiple sources and combinations*. *Thematic Strategy of Sustainable use of Pesticides* has been put in force to fill a legislative gap regarding how pesticides are used. The *Biocide Directive* is reviewed evaluating active substances in biocidal products for their risk to human health and environment. The *Mercury strategy* has been enforced by legislative acts banning mercury in certain uses. *The White Paper on Climate change adaptation* addresses among many aspects, health impacts of climate change.

Research: A large number of research projects have been funded in FP6 and FP7 to support the priorities in E&H Action Plan: (1) integration and strengthening of European environment and health research; (2) targeting research on diseases, disorders and exposures; (3) development of methodological systems to analyse interactions between environment and health; and (4) ensuring that emerging hazards on environment and health are addressed. HENVINET is one of these projects.

Indoor air quality: Improving indoor air quality two key elements: (1) addressing environmental tobacco smoke (ETS) and (2) developing networks and guidelines on other factors affecting indoor air quality by using research and exchange of best practices The Commission adopted on 30 June 2009 a proposal for a Council Recommendation on smoke-free environments calling on all Member States to bring in laws to protect their citizens from exposure to tobacco smoke by 2012. Work started to agree on key indoor pollutants and health effects, support t WHO to develop health based guidelines, establish criteria for

monitoring, increase public awareness and facilitate information dissemination, pilot project on indoor quality in schools and work on construction material and indoor air quality.

Electromagnetic fields: The latest SCENIHR opinion on the potential health effects of electromagnetic fields (EMF), adopted in January 2009, confirmed the conclusions of the previous assessments that current scientific evidence does not justify a change in the rationale used to set up the exposure limits proposed by Council Recommendation 1999/519/EC¹. However, this opinion identified a number of areas characterised by insufficient and contradictory information as well as a number of knowledge gaps.

Communication: In 2005, the European Commission (JRC) and the European Environment Agency (EEA) published a joint report (*Environment and Health EEA Report 10/2005*) which gave an overview of current environment and human health related issues in Europe. The report was followed in 2007 by a chapter in the EEA report “*Europe’s Environment – The fourth assessment*” prepared for the 6th UNECE Environment Ministerial Conference in Belgrade 2007. Currently, the Commission (JRC) and the EEA are preparing a joint Reference Report due in 2010 summarising the current knowledge and advances in the Environment and Human Health area.

Future: The follow up of the 2004-2010 E&H Action Plan is currently in discussion. The Environment and Health Consultative forum in December 2009, strongly endorsed that a follow-up should be prepared. An internal discussion is going on but there are currently no clear indications of future directions. A guess is that climate change and health will be on the agenda. Another issue which would need continued attention is Environment and Health Information Systems.

¹ Council Recommendation (1999/519/EC) of 12 July 1999 on the limitation of the exposure of the general public to electromagnetic fields (0 Hz – 300 GHz)

Overview of HENVINET: health and environment network

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The main aim of the HENVINET project is to create a permanent network of health and environment professionals. This is done through four activities, all centered around the priority health issues defined in the EU Environment and Health Action Plan 2004-2010. The first activity deals with identification of knowledge gaps in these priority health issues. The second activity evaluates decision support tools. The third activity is related to dissemination and external networking. The fourth activity is the development of web solutions. Main products of the project are knowledge evaluation methodology and resulting final policy briefs on selected issues, an operational database of decision support tools, and a web-based interactive facebook-like social networking tool.

The HENVINET knowledge evaluation method combines scientific review and expert evaluation. Issues are translated into a schematic diagram that identifies the links between environmental change and its impacts on human health. Experts are asked to assess the diagrams completeness and accuracy, and knowledge in each element and link. Agreements and disagreements are analyzed, and prioritized actions suggested. Seven diagrams are available for evaluation through our web site (DecaBDE and HBCD, chlorpyrifos, phthalates, traffic pollution, climate change and respiratory health, selected cancers), and additional are being prepared. So far, exposure assessment is often pointed out as the area of least knowledge. Suggested measures are concrete, and range from specifying what data need to be acquired to what preventive actions can be taken.

Decision support tools (DSTs) provide a practical means to translate knowledge to use. HENVINET provides an inventory of available DSTs, and allowing to search on keywords and free texts supplied by the owners or users of the DSTs. The database is open for any DST owner or user to supply their information.

Knowledge for decision making needs to be effectively communicated. The communication involves multiple disciplines and actors, and thus it requires facilitation. The HENVINET portal www.henvinet.eu offers several useful methods and means of such communication, discussion forums and other tools that contribute to make this communication timely, comprehensive and professional.

HENVINET expert consultation on health and policy implications of phthalates

Arno C Gutleb, [Karin E Zimmer](#), Solveig Ravnum, Martin Kraye von Krauss, Erik Ropstad, Janneche U Skaare, Albertinka J Murk, Janna G Koppe, Aileen Yang, Alena Bartonova, Hans Keune

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Keywords: Environmental health, policy relevance, expert elicitation, phthalates, stakeholder approach

The aims of the Henvinet consortium is to review, interpret policy relevance of and disseminate knowledge on environmental health issues for a wider use by different stakeholders and to support informed policy making. Review articles and thorough reports are important for defining the current knowledge in a field; however, it may not convey the most important messages to policy makers from a problem solving perspective. The Henvinet consortium therefore has explored expert consultation as a possible tool for complementing traditional risk assessment.

One environmental health issue dealt with by the consortium was phthalates. Phthalates are widely used in products as additives to polyvinyl chloride (PVC) products such as food packaging, medical devices, solvents in cosmetics, insecticides and pharmaceuticals or construction materials. When incorporated into PVC, phthalates are not chemically bound and are therefore easily released consequently resulting in animal and human exposure. Toxicological effects observed in animal studies include disruption of hormone levels and reproductive toxicity, foetal death, cancer, liver and kidney injuries.

To identify knowledge gaps and potential expert agreement or disagreement on the different aspects of the phthalates issue a causal diagram illustrating the cause-effect relationship between the production and use of phthalates, especially di(2-ethylhexyl) phthalate (DEHP) and its potential impact on health was developed based on recent literature. A group of experts was asked to express their confidence in the current knowledge in the different parts of the diagram by completing an online questionnaire. From these experts a group of six was selected to complete a second questionnaire and take part in an expert panel workshop where the implications of the evaluation results for policy and health were discussed. Priorities for further action were identified and the workshop aimed at arriving at a final expert advice for policy makers. Based on this a policy brief report was prepared.

3. The policy brief was then presented to decision makers and stakeholders in the field. They were asked to evaluate the usefulness of the report for their work and the quality of the report.
4. Results and conclusions of both the expert consultation and the decision maker evaluation will be presented.

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The “HENVINET” approach to knowledge quality evaluation

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Keywords: Expert elicitation, environment and health, knowledge gaps, problem solving perspective, policy relevance

We aim to identify and review current scientific work relevant to the EHAP, especially regarding the priority diseases and disorders and the environmental issues related to them. The methodology combines of scientific review and expert evaluation, and has several steps: (1) scientific review of the issue and development of a framework for assessment as a causal chain diagram, (2) evaluation of knowledge within this framework (3) expert workshop reviewing the evaluation results and suggesting informed actions and (4) broad stakeholder contact. Steps 1 and 2 were carried out for six concrete issues, and several more are in the progress.

We recently finished international expert workshops on brominated flame retardants, phthalates, climate change and the insecticide chlorpyrifos. In the expert workshops we also focus on policy implications of limited knowledge, e.g. with respect to the precautionary principle and public health risks. In a next step we would like to discuss the outcomes of the expert assessments with relevant stakeholders. Interesting topics that occurred in the expert workshop include:

- When do ‘we’ know enough for what and who decides? What is ‘our’ main ambition?
- Which criteria are important for deciding on the meaning & weight of knowledge?
- Which criteria for deciding on the relevant body of knowledge?
- Which criteria for the ‘right’ (group of) experts?
- Where does science become personal interpretation? From (lack of) data & uncertainties to science to knowledge from a problem solving perspective
- The proof of science is in the discussion?

No two issues are the same, but the methodology should be broadly applicable, and in a further discussion with experts we wish to point out the common issues.

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Stakeholder communication

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Keywords: Communication, portal, network, disciplines, environment, health, cooperation

HENVINET seeks to ensure that it provides the services its users want, when they want them in the way in which they want to receive them. To achieve this we have produced a web-based portal. This portal has the goal to establish a broad programme of knowledge exchange and consultation of individuals and groups on a regular basis. The topics for discussion or dissemination can be chosen by the users of the portal. Different disciplines are included in this network: scientists, policymakers, communication specialists. There is a broad range of topics already in place on the website.

The participation of the users is crucial for any activity within the network. The availability of content on the website is crucial. In the end, the portal will become self-supporting by the input from its users.

Stakeholders might inform each other about the potential and power of the portal.

**The INTARESE and HEIMTSA Toolbox – A Guidance System and Resource Center
for Integrated Environmental Health Assessment**

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Keywords: Integrated environmental health assessment

The two FP6 integrated projects INTARESE – Integrated Assessment of Health Risks from Environmental Stressors in Europe and HEIMTSA – Health and Environment Integrated Methodology and Toolbox for Scenario Assessment both have the objective to develop, test and demonstrate the use of methods and tools for integrated assessment of health impacts to support policy in Europe. Both project cooperate closely and will finish in January 2011. Their main outcome will be on the one hand a toolbox, that contains as well methodologies as data and tools and on the other hand a common case study, that should contain a full example of an integrated environmental health impact assessment following the recommendations developed in the two projects.

The so-called toolbox is a place where all relevant information around integrated environmental health impact assessment (IEHIA) can be found. It contains a guidance system and a resource centre. The guidance system introduces a conceptual framework, explains the different steps along an IEHIA and describes the state of the art approaches and methods to use for an IEHIA. The resource centre contains information that should support carrying out an IEHIA. It thus contains information about and links to models, data and relationships to use as well as tools and data themselves. Though not completed, the structure of the toolbox can already be seen at www.integrated-assessment.eu. Users are as well assessors, that want to carry out an IEHIA, but also the clients of the assessors, e.g. policy makers. In addition, information for other interested persons including students will be available.

The case study chosen shall answer the question: What are the (negative or positive) impacts of EU mitigation options to reduce greenhouse gas emissions and of EU adaptation options to reduce impacts of climate change. Preliminary results show, that health impacts of quite a number of climate change mitigation policies and adaptation measures (e.g. improving energy efficiency in the transport and housing sectors) are as important as the climate change effects. Some policies, e.g. biomass burning and insulation of houses might cause quite high additional health impacts. In general this shows, that integrated health assessment might influence policy recommendations drastically and is thus an important part of support for policy decisions.

Acknowledge Funding Source: This work is carried out within the INTARESE and HEIMTSA projects funded by the European Commission, DG RTD, 6th Framework Programme

Integrated Health and Environmental Impact Assessment Toolbox

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Keywords: Integrated assessment, health impact, environmental change, computational toolbox

This paper outlines the work of two integrated projects (HEIMTSA and 2-FUN) funded by the European Commission on integrated health and environmental impact assessment towards the development of computational tools. The aims of these projects are to quantify as fully as practicable the environmental health effects of policies in various sectors, including both policies designed to improve public health and the health impact of policies developed for other reasons; give an unbiased assessment of the associated uncertainties; identify priority information and the respective knowledge gaps; enable assessment of health risk and impacts of future policies.

The HEIMTSA toolbox, part of the integrated assessment toolbox developed jointly with another EU-funded project, INTARESE, provides an internet-based work space for decentralised and grid computing of the health impact of European policies that impact the state of the environment. The core of the system is a geo-referenced database that handles input and output data (incl. intermediate results) of model runs. The models included in the assessment „talk“ to each other through the geodatabase through well-defined interfaces. Simple models are as far as possible implemented into the platform. More complex models will be run on the local servers where they reside. In addition to the model input/output, the HEIMTSA database contains ancillary information such as population data; land use / land cover; time activity patterns; background rate of diseases; exposure-response functions for the health end-points of interest; monetary valuation functions for the health end-points of interest

Beside the HEIMTSA database the toolbox includes five vertical computational modules:

1. Emission module (to calculate emissions)
2. Concentration module (from emission to concentration)
3. Exposure module (from concentration to exposure)
4. Health impact module (from exposure to health impacts)
5. Monetary valuation module (from health impacts to costs)

and two horizontal modules: (a) visualization module and (b) uncertainty module.

An alternative paradigm is pursued by 2-FUN, which has developed an exposure assessment system based on multi-media models; has integrated them in a common software model for full-chain assessment; has integrated in the software all the functionalities for generic and/or site-specific uncertainty and sensitivity analysis. The two toolboxes provide a comprehensive set of computational tools for integrated health risk and impact assessment of environmentally-relevant policies.

Acknowledge Funding Source: This work was co-funded by the European Commission 6th framework programme for RTD under the integrated projects HEIMTSA and 2-FUN.

HENVINET Decision support tool repository

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Although our knowledge is limited and imperfect, we have learnt a lot on the health consequences of environmental stressors. Such knowledge is often accessible only to scientists or usable by a small community of experts. How can we make this knowledge more available for in decision making processes at all levels? How can this knowledge have an impact in daily life and in the planning of short-medium and long term actions and policies?

A key solution to the knowledge use dilemma is given by DSTs. Within HENVINET we defined DSTs as ‘any tool based on E&H Knowledge that can be used for making decisions for reducing the negative health effects of the environment, from the daily operational level to the long term policy making perspective.

We have identified the following types of DSTs:

- Integrated software tools (modelling significant sections of the causal chain from sources to health effects)
- Specific Software Tools (focussing on a few rings of the chain)
- Web databases
- Methodologies (e.g. HIA)
- Handbooks (e.g. EUPHIDS)
- Frameworks for Decision Making
- Recommendations (e.g. for couples wishing a baby in polluted areas)
- Guidance (e.g. for estimating disease burden)
- Info and Knowledge System (e.g. ENHIS from WHO ECEH) Indicators

The HENVINET Meta DB provides easy access and management, and allows the user to browse data on identified DSTs, to input data on a new DST, to update the information, correct errors, or search for DSTs with specific characteristics. The MDB in particular allows to describe the purpose of the DST, its application areas, the expected users, the considered stressors and health outcomes, the validation-application.

Contact details of the owner and a summary have been collected for over 100 decision support tools. Normally, the information about a DST is entered into the database by the DST owner. In order to ensure some basic level of correctness of the information in the database, each member of the consortium has been assigned a number of decision support tools within their area of expertise, and asked to review the information submitted by the owners. This review also includes an assessment (evaluation) of the DSTs regarding their areas of use. At the moment, over 60 full records of DSTs have been reviewed by the consortium.

Communicating Environmental Health Justice Issues: Best Practices from the US

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Keywords: Environmental health, environmental justice, community-based participatory research, communication

This presentation will present and discuss three environmental health communication case studies from the United States that are environmental justice-centered, community-based, policy-oriented, and research-driven: a curriculum for middle school students to raise awareness about a local Superfund site; a survey to measure disproportionate environmental health burden in a heavily polluted community; and a legislative approach to address a state's legacy of industrial contamination

Acknowledge Funding Source The work described in this presentation has been funded by multiple funding sources over multiple years: Grant number 5 P42 ES013660-02 from the Superfund Research Program of the National Institute of Environmental Health Sciences, NIH (2007-2009); Brown University Royce Fellowship (2007); Brown University UTRA award (2008); Brown University Pembroke Center Barbara Anton award (2008); Avon Foundation (2008); Fulbright scholarship (2009-2010).

The HENVINET Networking Portal – Communicating E&H Issues Results of a Survey among E&H Experts

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Keywords: environment and health; communication; stakeholder participation; information; policy making; HENVINET Networking Portal

The HENVINET Health & Environment Networking Portal was designed specifically for the global environment and health community. Based on a range of tools for locating and accessing expertise, sharing knowledge, and networking with peers, the HENVINET portal offers a multi-stakeholder approach to the most pressing environment and health issues evident today.

By means of a voting system, the participants of the HENVINET Final Event were asked to participate at an interactive voting session to receive feedback about communicating via the HENVINET portal and suggestions for further use and development.

The following areas have been addressed:

- Analysis of the stakeholders
- Needs of the participating stakeholders
- How can we better involve stakeholders in our network activities?
- Science-policy interface

53 persons attended the session and participated in the vote. The whole presentation together with more detailed results is available at www.henvinet.eu. The results given here are a short summary.

1. Asked for the most important feature of the HENVINET portal, the majority states the offer of scientific sound information that is provided by experts in the user's field of interest (32%). Detailed issues such as user friendliness or an automatic system for notifying new items on the portal seem to be less important (4%; 0%).
2. The main reason to make a policy maker becoming a successful user of the HENVINET portal seems to be the option to interact with scientists (28%) in order to receive information on specific policy issues (26%). Further information that could be displayed on the portal, such as automated lists of topics, seems to be less important (6%).
3. The participating voters mainly receive their information from other sources outside the portal (23%) but 50% would be willing to contribute with their information and expertise to the content of the HENVINET portal.

4. The HENVINET portal seems to be a suitable platform not only for scientists, but also for policy makers, consultants and other relevant stakeholders (48%). Interestingly, the participants seem to see no value for citizens to attend the portal (0%).
5. Asked for actions in order to raise the number of users, the audience suggested that the HENVINET portal should foremost provide scientific sound information (34%), gathered by (paid) scientist/s in order to ensure the quality of the information (19%). Additionally, the participants wish the portal to have more additional features, such as research calls, conference announcements etc (25%).
6. More than 30% of the voting participants consider the decision support tools developed by HENVINET as being relevant for the policy makers' decision making. Nevertheless, they need to be sufficiently validated first (36%). Another part of the participants (19%) recommends that instead researchers should use the DSTs and forward the results to the policy makers since they do not seem to have enough insight in their use.
7. The participants were asked for the most important factor(s) in the development of a policy advice. The highest proportion (41%) seems to agree that policy makers are highly influenced in their decision making process by the media. Asked for the desirable most important factors in the development of a policy advice, 50% of the participants agreed on the fact that the traditional evidence based culture is in need of critical discussion and innovation. Only a smaller number of voters seem to favor the view that scientific information as it is today should further be used by policy makers for decision making.
8. Asked for their own way of communication, 57% of the conference participants state that they present their results either via articles or conferences. A fourth reports their results directly to those who ordered the research. Only a low percentage (5%) uses the media to publish their results.
9. The participants express their wish for more interdisciplinary research in the EU. Almost half of the audience (47%) requests that the EU has to set up interdisciplinary workgroups on different topics. This supports previous results of this session where 50% of the audience states that the traditional evidence based culture is in need of critical discussion and innovation because of the limits of current scientific practice with respect to complex important issues in environment and health.
10. As the results of the former questions already implied, the highest portion of participants is scientist and providing information on environment and health issues to policy/decision makers.

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Workshop intro: Environment & health complexities - challenges for the near future

B Forsberg for The HENVINET Project

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Keywords: Air pollution, knowledge, health effects, epidemiology

Among experts, the knowledge on air pollution effects on humans has grown rapidly over the last 10-20 years. In the 80's was still the perception that there were clear thresholds below which air pollution does not produce any effects on health. This created a strong belief in the limit values as a method to indicate the air pollution situation. Nitrogen dioxide as such was considered to be causal component resulting in respiratory symptoms and lung cancer, and Air Pollution effects were considered to occur mainly in the respiratory system.

New knowledge has meant that we do not believe in the existence of absolute thresholds for health effects. As a result, quantitative health impact assessment has become important to describe the air pollution situation. We also understand that nitrogen dioxide has been an indicator for combustion related and vehicle exhaust components, while the impact on health in significant part is caused by exhaust particles. Gradually the awareness of these ultrafine particles and their effect increases. Now we see the effects on heart and blood vessels as a bigger problem than the effects on the lungs. It is also possible that these very small particles have effects ranging from impact on fetal development to dementia in the elderly. This means that the health costs could be much larger than now estimated. We can therefore expect a new era of air pollution epidemiology.

HENVINET portal: A platform for collaboration between environmental health and oncology in preventing and treating cancer

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Keywords: preventive measures, oncology, environmental health, complexity

HENVINET portal: a platform for collaboration between environmental health and oncology in preventing and treating cancer Environmental health cancer research is focused on the relationship between agents from living and occupational environment and cancer. Oncology in turn treats subjects with cancers caused by carcinogens. However, data on these subjects, collected during diagnostics and therapy, are not communicated to environmental health. One of the reasons may be uncertain etiology of a number of cancers, but the other is weak collaboration between environmental health and oncology professionals. Unlike a few decades ago, when scientific and professional methods differed between the two fields, today both apply similar biomarkers and tools (SNPs, genotoxicological methods, transplacental and early childhood cancer risk biomarkers, xenoestrogen levels, sex differences, systems biology). Within the project Health and Environment Network, the European Commission has developed an Internet portal at www.henvinet.eu which covers diseases related to environmental exposures such as asthma, endocrine disruptors, and cancer. For the first time, the portal has posted cause-effect for cancer, using principal of complexity bringing together all known physical and chemical parameters which may play a role in cancerogenesis, including genetic predisposition, enzyme polymorphisms, family cancer history, and statistical relevance, all supported by references and a dictionary. The portal is intended as an interactive platform which enables direct communication between experts and interest groups. Information are given in short, condensed form and allow every portal visitor to share their own information. The portal has a potential to link environmental health and oncology and bring new quality to both fields through more efficient application of biomarkers, new strategies in drug development, resulting from new insights in the interaction mechanisms between environmental carcinogens and the cell, more efficient application of databases from both fields in order to improve treatment, oncology participation in cancer preventive activities and cancer patient therapy on individual basis, taking into account individual environmental radiochemical exposure

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Nanoparticles: Environmental and Health Aspects

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Science and technological progress can enhance the quality of life and economic development on a global basis. As a growing and widely applied science, nanotechnology has a global socioeconomic value. On one hand, the new features of designed Nanoparticles (NPs) provide them with so far unprecedented technical capabilities and sometimes enable them to perform absolutely novel tasks in technology and science, unfortunately, on the other hand, just the same new qualities can concurrently also include undesired intrinsic features, which sometimes lead to harmful interactions with exposed organisms. The great speed at which new engineered NPs are being manufactured far exceeds the potential avenues, abilities and resources available for their parallel scrutiny of physicochemical analysis and investigation of their possible toxic health effects. The growth and use of nonmaterial in consumables and medical applications without prior human health evaluations challenge society with the possibility that they could become the “asbestos of the 21st century”. At the moment it is unclear whether the benefits of nanotech outweigh the risks associated with environmental release and exposure to nanoparticles. Nanomaterials have different behaviours in organisms, soil, and water. We need to develop and design experiments very differently to determine, how nanoparticles behave compared to traditional environmental pollutants. Similar to technologically based research, in safety research we also need a shift away from pure fundamental research to a new direction which facilitates the implementation of results in risk-oriented and comprehensive assessments (or recommended actions) and the covering of the relevant toxicological and ecotoxicological endpoints.

On the basis of these considerations the present talk will deal with the following areas based partially on experimental evidences:

1. The source of nanoparticles in the Environment
2. The effect of nanoparticles on the environment and its correlation with human health problems and health impacts due to direct exposure.
3. Research strategies to evaluate the toxic potential of NPs.

European Human Biomonitoring programme - COPHES

Casteleyn, L, Dumez, B, Polcher, A, Kolossa-Gehring, M, Becker, K, Castano, A, Jiménez, J A, Schoeters, G, Smolders, R, Sepai, O, Knudsen, L E, Horvat, M, Bloemen, L, Biot, P, Angerer, J, Koch, H, Joas, R

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Keywords: Human Biomonitoring, Europe, functional framework, harmonized protocols, pilot phase

In support of the European Environment and Health Action Plan 2004-2010, European scientists from 35 institutions in 27 European countries formed a ‘COnsortium to Perform human biomonitoring on a European Scale’ - COPHES, funded by the European Community's Seventh Framework Programme (FP7/2007-2013).

They will develop a functional framework allowing the collection of comparable HBM data throughout Europe. The framework will also include a roadmap for integration of HBM data with environmental and health information and will address ethical aspects specific for the collection and storage of human material and data.

Improved comparability of European HBM data will allow cross boundary evaluation of human exposure and support the elaboration of background levels and guidance values. This will facilitate, for example, the identification of potential high exposure populations or subpopulations and lead to focused research projects.

HBM is an important tool to support E&H policy making. It allows superior quantification of exposure of the general population to existing and emerging environmental substances. HMB also enables evaluation of policy actions aimed at reducing exposure, more comprehensive health impact assessments of policy options, control of chemical regulations (e.g. REACH), etc.

Starting from an inventory and analysis of similarities and discrepancies in existing and planned HBM studies in different EU MS, harmonized study protocols will be prepared and tested out from 2011 onwards. Although the focus at this stage is given to mercury, cadmium, phthalates and ETS, further substances will be included in the coordinated approach. Measurements thereof depend, however, on priorities and funding possibilities of Member States.

An extensive training and capacity building programme will also be developed for all European countries who express an interest. Furthermore, an extended communication strategy will target not only the scientific community and the individual participants in studies, but also policymakers, stakeholders and the population at large.

The project is coordinated by BiPRO GmbH, Germany, in close collaboration with the Katholieke Universiteit Leuven, Belgium. It started on 1 December 2009 and is scheduled to run for 3 years.

Project website: www.eu-hbm.info

Acknowledge Funding Source: EC FP7/2007-2013, Environment, GA No. 244237 - COPHES

**School Environment and Respiratory health of Children (SEARCH)
Short summary of the SEARCH project**

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The Conference for Health and Environment Ministers from the 53 countries of the European region of the World Health Organisation, which took place in Budapest in 2004, emphasised the problem of children's health and their right to live and grow up in a healthy environment. With this goal, the Inter-Ministerial Conference in Budapest launched the European Action Plan for Environmental Health and Children: the CEHAPE (Children's Environment and Health Action Plan for Europe). As part of this Plan, Member States not only confirmed their engagement but also the beginning of concrete measures in order to implement the key objectives contained in the Action Plan, including the prevention and reduction of respiratory pathologies resulting from the environmental pollution of outdoor and indoor air among children.

In this context, the multi-centric European Project SEARCH was born, based on the pilot project "Cleaner Environment, Better Future for Our Children", promoted and co-ordinated by the Regional Center for Central and Eastern Europe (REC) in Hungary, currently taking place simultaneously in 8 European countries (Italy, Albania, Bosnia, Herzegovina, Serbia, Slovakia, Austria and Norway).

The SEARCH project was implemented in Albania, Bosnia and Herzegovina, Hungary, Italy, Serbia and Slovakia. The project was coordinated by of the Regional Environmental Center for Central and Eastern Europe and the research was coordination by the National Environmental Health Institute of Hungary and the Italian Institute for Environmental Protection and Research (ISPRA) between 2006 and 2010. There are two associated countries in the project Austria and Norway.

The SEARCH project is an example of regional cooperation in order to implement the Children's Health and Environment Action Plan (CEHAPE), Priority Goal 3: Prevention and reduction of respiratory diseases of children due to out-door and indoor air pollution, by complex research in schools.

The project, launched and financed by Italy's Ministry for the Environment, Land and Sea and in collaboration with the REC based on bilateral co-operation between Italy and Hungary, is aimed at promoting the improvement of indoor air quality in schools in order to reduce the risk of acute and chronic pathologies and the number of allergic attacks among sensitive subjects. Following the study and analysis stage, the Project aims to encourage proposals of realistically practicable measures for improving air quality in schools and the spread of understanding about the health risks posed by environmental factors to families, school staff and all of the decision-makers who, in different ways, participate in caring for our young students' health.

The international research team of the SEARCH project found that outdoor and indoor environment in schools, the standard of living of families and parental attitude

to children's health issues determine the incidence of respiratory diseases among children. The long-term goal of the project is to develop suggestions for preventive and legal measures, and criteria for controlling indoor air quality with special attention to various allergies.

The research results of the SEARCH project, the conclusion and policy recommendations will be presented at the 5th Ministerial Conference on Health and the Environment organised by the WHO Europe, which will take place in Parma in March 2010.

Environment and Health in Europe: WHO's view after the Fifth Ministerial Conference

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In the late 1980s, European countries launched a process to counter the most significant environmental threats to human health. Progress towards this goal has been marked by a series of Ministerial Conferences, coordinated by WHO/Europe (covering 53 Member States). Conferences took place in Frankfurt in 1989, Helsinki 1994, London 1999, Budapest 2004 and Parma 2010. These Conferences bring together different sectors to shape European policies and actions on environment and health. Since 2004, the overarching theme of the Conferences has been Children's Health, for its intrinsic priority as well its relevance for sustainability and future generations. Thus, four so called Regional Priority Goals (RPG) were identified and make the basis for the Children Environment and Health Action Plan (CEHAPE): RPG I: Prevent and significantly reduce the morbidity and mortality arising from gastrointestinal disorders and other health effects, through safe and affordable water and adequate sanitation for all children. RPG II: Prevent and substantially reduce health consequences from accidents and injuries by promoting safe, secure and supportive human settlements. RPG III: Prevent and reduce respiratory disease due to outdoor and indoor air pollution. RPG IV: reduce the risk of disease and disability arising from exposure to hazardous chemicals (such as heavy metals), physical agents (e.g. excessive noise) and biological agents and to hazardous working environments during pregnancy, childhood and adolescence. In Parma these priorities were confirmed, and important cross-cutting dimensions were added, notably the implications and constraints posed by climate change and the urgency to address not only the adverse health impact but also their unfair distribution across strata of society (while emphasis had previously been mainly on between countries inequalities).

With the Parma Ministerial Declaration, the key policy outcome of the Conference, endorsed by 53 Member States, governments agreed to implement national programmes to provide equal opportunities to each child by 2020 by ensuring access to safe water and sanitation, opportunities for physical activity and a healthy diet, improved air quality and an environment free of toxic chemicals. Governments vowed to tackle the adverse health impact of climate change and to reduce social and gender inequalities in exposure to risk. They also pledged to place health at the centre of socioeconomic development through increased investment in new technologies and green jobs.

During 2010 and beyond, the European environment and health process will be revitalized through a series of new arrangements. The governments gathered in Parma agreed to strengthen political coordination between regular ministerial conferences, and will now involve ministers directly in steering the Process - to ensure that cross-sectoral issues are given the highest possible political profile. Ministers from the 53 European Member States will meet again at the Sixth Ministerial Conference on Environment and Health in 2016.

From science to policy: translation of human biomonitoring results into policy measures in Flanders (Belgium)

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Keywords: Human biomonitoring, policy relevant research, complexity, action-plan, expert consultation, stakeholder jury, multi-criteria analysis

To obtain better information for public policy decisions, Flanders in 2002 initiated a five-year human biomonitoring programme covering around one-fifth of both its territory and population. The programme collects a variety of biomarkers of exposure (including e.g. DDE, heavy metals, dioxins, exposure to PAHs, benzene) and effect (including e.g. DNA damage, asthma en allergy,...) in eight areas and for three age groups (newborn babies, adolescents, elderly). The study showed differences in biomarker values of exposure and effect for the different areas and found measurable biological effects at exposure levels well below current standards.

A complex and vast amount of scientific data became available for the Flemish policy makers, however translating human biomarker results into concrete policy measures is not as easy and straight forward as it might seem. In order to guarantee that the results of the human biomonitoring campaign are translated into a policy response, a phased action-plan was developed. It implies 3 phases in which (1) the seriousness of biomarker anomalies is evaluated and priorities are set; (2) the sources of pollution that are causing the anomalies are traced; and (3) concrete policy measurements are proposed when appropriate. These phases are run through with an expert panel and a jury including local stakeholders and authorities.

We will discuss how the action-plan worked out in practice and resulted in two different cases: increased levels of persistent organic pollutants in the rural areas in Flanders and the increased asthma and allergy incidences in Flemish city areas. This resulted in two concrete policy action plans which include a wide variety of policy actions concerning further research, awareness raising, monitoring, adaptation of product policy, We will also briefly discuss some results of an evaluation of the action-plan by international experts and a diversity of Flemish experts and stakeholders as a starter for further discussion.

Acknowledge Funding Source The human biomonitoring campaign and the action plan is being carried out by the Flemish Centre for Health and Environment, working directly for and in close collaboration with the Flemish government.

Policy integration

Dr Ingvar Thorn

The presentation discusses different interpretations of policy integration and describes different cases within the area of Environment and health, and Hazardous substances, where science has contributed to European policies. The role of intermediary organisations are described and experiences are analysed. HENVINET's work on information, communication and policy integration is commented.

POSTER PRESENTATIONS
TOPIC 1 – E&H PROJECTS' RESULTS AND PLANS

Economic assessment of exposure protocols for PAHs and PCBs

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This study is one task of a project ENVIRISK (Assessing the Risks of Environmental Stressors: Contribution to Development of Integrating Methodology). ENVIRISK is a 2,5-year (10/2006 – 3/2009) specific targeted research or innovation project under the EU 6th Framework Programme for R & D- Priority 8.1 Policy-oriented research, Contract No. SSPE-CT-2005 – 044232. The aim of ENVIRISK is to develop an integrated methodological framework for identification of health risks caused by exposure to environmental factors, with a view to provide useful information for prevention and targeted policy measures. The framework include the development and piloting of protocols and methodologies for exposure assessment and health impact assessment in specified areas relevant to the implementation of the European Environment & Health Action Plan (EHAP).

The aim of this study is to provide the relevant information for assessing the available options for exposure protocols in the view of providing a cost-benefit recommendation for exposure and health impact assessment. It includes: (i) define the exposure scenarios, methods and protocols for PAHs and PCBs; (ii) summarize the data needs and describe the available data; (iii) analyze the cost for data and information gathering relevant for methods and protocols.

The results showed that (i) there is no available information for the price for the PAHs measurement and its relevant data gathering; (ii) the cost of sampling and analysis is a function of the number of monitoring stations, the sampling method used, the frequency and analytical methodology adopted; (iii) cost for analysis of PAHs and PCBs exposure assessment is different between different countries; and (iv) in average, the cost for analysis of PHAs and PCBs exposure assessment is about 200,000 and 700,000 Euro, respectively.

An epistemological shift towards complexity poses new challenges to the Flemish Environmental Health Policy Arrangement

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Keywords: Science policy interface, boundary work, policy integration, complexity, environmental health

Environmental health risks are increasingly regarded as complex issues. Complex problems, also labelled ill-defined, wicked or messy, are characterized by radical uncertainty, a plurality of legitimate perspectives and an unclear sense of all consequences and/or cumulative impact of collective action. Complexity goes parallel with three related shifts: (i) beyond the traditional positivistic epistemology, characterized by rationality, full knowability and disciplinary reductionism, (ii) beyond the traditional sectoral policy arrangements, as complex issues transcend these traditional policy fields, (iii) a shift towards new arrangements in the science policy interface, as science is no longer the unquestioned source of legitimacy for policy arguments. To summarize, complexity challenges traditional boundaries and stimulates cross- boundary arrangements at three levels: between scientific disciplines, between policy fields and between science and policy. As a consequence, complexity asks for new epistemological and methodological tools and for novel institutions. All these shifts apply in particular to the environmental health domain.

Starting from these epistemological and institutional perspectives, this PhD-project analyses Flemish environmental health policy arrangements and their recent developments. Based on document analysis and interviews, it analyses the relationship between science and policy in the environmental health domain over the last three decades, and tries to explain its changes - and continuities -. Moreover, it aims at assessing the effectiveness of these novel organisational facilities and methodological tools, albeit it through the eyes of the stakeholders, when it comes to deal with complexity and uncertainty.

In this respect, the Flemish Environmental Health Network is emblematic: it was established in response to the dioxin crises related to incinerators located in residential areas. The network aimed at the actual participation of diverse stakeholders at different policy levels to improve the cooperation and communication between science, politics and society on the one hand, and between environment and health on the other hand. The case exemplifies how the then predominating Flemish environmental health policy arrangement was challenged by a (dioxin) crisis, and how this crisis in turn induced an epistemological and an organisational renewal. Part of this renewal is the development of new tools and methodologies (e.g. a programme of biomonitoring, an action plan to translate biomonitoring data into policy priorities & measures, a guideline to risk communication) and new organisations and platforms (e.g. the Flemish Environmental Health Network; the Flemish Centre of Expertise for Environment and Health).

“Health Risk from Environmental Pollution Levels in Urban Systems” project: Madrid preliminary results

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Keywords: PM10, ozone, cardiovascular, respiratory, mortality, morbidity, Poisson regression models, relative risk.

Abstract (max. 350 words) HEREPLUS (Health Risk from Environmental Pollution Levels in Urban Systems) is a project funded by the European Union that is being developed in four European cities: Rome, Dresden, Athens and Madrid. Health effects of the environment are being determined by combining factors such as air pollutants and vegetation. Time comparison among health data, concentrations of particulate matter and ozone and vegetation type in the study areas are being used to quantify the sanitary risk for the population of each area.

Regarding to Madrid, the territory has been divided into seven homogeneous areas. These correspond to the environmental classification established by the Madrid Community government in 2001 and used for the period 2001-2006 to fulfil the requirements of the EC/96/62/CE Directive concerning the air quality assessment in the European Member States territory. Each area is representative of a specific air quality index. It has been calculated the daily mean of PM10 and O3 concentration values coming from different stations in each area. Madrid municipalities have been assigned to one of the seven Madrid Community areas in order to link the residence place (municipality) of each person (corresponding to a morbidity or mortality outcome) to an environmental area.

It has been calculated the daily number of hospitalizations or deaths, considering the corresponding residence places in each area. The studied causes of death were: total number of deaths related to cardiovascular diseases, respiratory diseases or all-causes except accidents. The following causes of hospital admissions were analysed: total number of hospitalizations related to cardiovascular diseases or respiratory diseases.

Regarding to time, the period of the study has been set between 2003 and 2005.

The chosen person-related variables are gender (male or female) and age (population divided into 3 groups: 0 to 14 years, 15 to 64 years and more than 64 years).

Poisson regression models are being used for modelling the relationship between the exposure and response variables. The importance of constructing these models is that they enable quantification of the statistically significant associations between the environmental variables and analyzed health outcomes (deaths or hospitalizations), by calculating the relative risk, that is obtained from the models estimates values.

Acknowledge Funding Source: EUROPEAN UNION

Conditions of Safety, Health and Hygiene in Carpentry Shops in the District of Figueira da Foz

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Keywords: Safety at Carpentry Shops, Noise exposure, HSW

The general objective of this study was to study the conditions of safety, health and hygiene in the carpentry shops in awareness that these factors influence the efficacy of these shops but we looked in particular at the level of noise workers were exposed to. This study was carried out over two school years, 2006/07 and 2007/08 and can be classified as descriptive and exploratory, level I with a transversal cohort. The sample type was non-probabilistic and by convenience. The study was executed through a check-list to evaluate general conditions of HSW, through non-participatory observation of noise levels using a sonometric device, *Bruël & kjaer*, model 2260, series 2335758, class I. For data description a statistically simple descriptive method was used (measures of location and dispersion) and presuppositions were tested through applied statistics of (parametric or nonparametric - Symmetry, flattening, Normal distribution). Hypotheses testing applied were: χ^2 of Adherence, Mann-Whitney, Kruskal-Wallis, *t*-Student for a sample; *t*-Student for independents samples, ANOVA factor (*Welch test*) and the multiple comparison test Games-Howel. Statistical interpretation of the tests were made with a significance base of $\alpha=0,05$ (I.C. 95%). Analysis revealed that in terms of safety, health and hygiene few workplaces met legal standards. The level of conformity to HSW: for “Noise and Vibrations”, for the majority of carpentry shops (80%), was unsatisfactory. Likewise, $\pm 50\%$ of the carpentry shops were in *insufficient compliance* for legal norms of ventilation, temperature and humidity, manual transportation of loads, dangerous substances, general maintenance, ergonomics, protection from machines and operations, and individual protection in the areas of sanitation/clothing/and food services. However, the carpentry shops with organized HSW services had better results in terms of noise compared to those which did not have organized HSW services, although the differences were not significant ($\alpha > 0,05$). Average *Lex* values of 8h were significantly higher ($\alpha < 0,001$) than those legally stipulated (80.00 dB(A). Evaluation by analytic parameter *LAeq* (the sound level remaining equivalent) by type of machine showed significant differences ($p\text{-value} < 0,001$). The “circular saw” and the “band saw” were the machines with the highest continual level of noise compared to the other machines.

Levels of Particulates in Areas of Metropolitan Lisbon and Porto

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Keywords: Public Health, Indoor Air Quality, Atmospheric Pollution, Particulates levels

This study is of particular concern at the level of public health, since exposure to certain types, sizes and concentrations of particulates cause adverse effects on welfare and health of certain populations. The main objective of the study was to evaluate the variation in levels of particulate concentration over the past years in major metropolitan areas of Portugal. By definition, this study is *Descriptive-Correlational* (level II). It was retrospective in nature. It was designed as a sample study comprised of all the samples (concentration of airborne particles) collected during the years 2005, 2006 and 2007 by the monitoring stations in metropolitan areas of Lisbon and Oporto. For data description, simple descriptive statistics were used (measures of location and dispersion) and presuppositions were tested through applied statistics of (parametric or nonparametric - Symmetry, flattening, Normal distribution) were tested. Hypotheses tested were: ANOVA a fixed-effects model I for independent samples; ANOVA for Repeated Measurements a fixed-effects model I; ANOVA for mixed effects; ANOVA II for fixed effects. Statistical interpretation was based on the level of significance $\alpha=0,05$ (I.C. 95%). The results obtained for the calendar year 2005, were significantly higher ($\alpha<0,001$) than the value $40 \mu\text{g}/\text{m}^3$ considered acceptable for the average concentration of airborne particulates in both the cities of Lisbon and Oporto. However, measurements of particulates taken in 2007 were significantly lower ($\alpha<0,001$) in both cities. Thus, we conclude through observation that a statistically significant reduction ($\alpha<0,001$) in the average amount of airborne particulates took place during the three years of the study. This tendency was most clearly confirmed in Lisbon and Oporto where the reduction of particulates was the sharpest between 2005 and 2006 ($\alpha<0,001$). Broken into hourly periods, a significant reduction was recorded ($\alpha<0,001$) of the average concentrations of particulates during the three years of the study within the different periodic testing schedule. In terms of particulate levels analysed in according to local, the highest concentrations in Lisbon were recorded at: "Avenida da Liberdade" and "Entrecampos", and the lowest in "Odivelas". For Oporto, the highest concentrations were recorded at "Vila do Conde" and "Espinho", with "Antas" having the lowest concentration.

Occupational Stress in Prison Guards – Via the ‘Occupational Stress Indicator’

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Keywords: Occupational Stress, Prison guards, Public Health

Occupational stress has become a factor within public health since it has obvious effects on interpersonal and family health, productivity and satisfaction in the workplace. Although a degree of stress is involved in every profession, prison guards are particularly vulnerable. This is largely due to prisons being institutionally rigid organizations, with conditions easily leading to states of tension, imbalance and insecurity identified as occupational stress. The aim of this study was to evaluate the stress levels experienced by guards during their work. The study is defined as *Descriptive-Correlative* (level II) of transversal cohort. The study was conducted from Janeiro to July 2009 in Coimbra. The sample type was non-probabilistic and by convenience. The “*Occupational Stress Indicator*” scale was used as the instrument of evaluation for simple statistical description and presuppositions were tested through applied statistics of parametric or nonparametric. Statistical interpretation of the tests were made with a significance base of $\alpha=0,05$ com IC de 95%. The study sample consisted of 30 guards, 82% of whom were male with the majority in the 40-49 age bracket. The predominant educational level extended to the 9th grade with most guards having 21 or more years of service. Finally, most guards were in the professional category “leading prison guard”. The male guards who had completed secondary education or above in the category “prison guard 1st class” were those with the greatest job related stress ($p\text{-value} >0,05$). In terms of career level, those ranked “prison guard 1st class” and “chief prison guard” sensed stronger sources of pressure in the workplace ($p\text{-value} >0,05$). In terms of age, a negative correlation was found with the “career and satisfaction” sub-scale which allowed us to conclude that it was the younger guards who experienced the greater sources of pressure ($p\text{-value} <0,05$). Furthermore, positive and significant correlations were found between the sub-scales “career and satisfaction”, “intrinsic sources of work pressure”, “climate and organizational structure” and “work-home interface”. Finally, those professionals with 21 years or more of experience perceived greater sources of pressure in all the sub-scales in comparison to those with fewer years of service ($p\text{-value} >0,05$).

Acknowledge Funding Source: Coimbra Penitentiary

Granite's Influence on the Radon Level in Vila Pouca de Aguiar (Village in Portugal)

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Keywords: Radon, environmental risk, natural radioactivity, granite

Natural radiation is responsible for about 82% of the annual dosage of radiation received by humans. Half of this comes from radon gas emitted from uranium in rocks and soil and may accumulate in poorly ventilated spaces like homes and cellars. Exposure to this gas may provoke lung tumours. The district of Vila Pouca de Aguiar is above the Penacova-Régua-Verim fault, a largely granitite region where this stone is also commonly used in building construction. This study was carried out to determine the concentrations of radon gas in homes in correlation to the presence of granite. This was a descriptive-correlational study, level II, of transversal cohort of two years in duration; sub-divided into two distinct phases: (2007/2008 e 2008/2009). This research was conducted in the village of Vila Pouca de Aguiar. The study sample comprised 9 homes with granite (*experimental group*) and 10 homes without any granite in their structure (*control group*). Sampling was non-probabilistic and by convenience. Data was collected using passive detectors type LR-115 and a *check list* conforming to the characteristics of the homes studied. Data was elaborated in a simple, descriptive manner (measures of location and dispersion) and presuppositions were tested through applied statistics of (parametric or nonparametric - *Symmetry, flattening, Normal distribution*). Hypotheses testing were through: *t*-Student for a sample; *t*-Student for independent samples, ANOVA fixed factor; Kruskal-Wallis; rho de Spearman. The results showed that the average radon concentration in homes in Vila Pouca de Aguiar (823,74 Bq/m³) significantly exceeded the 400 Bq/m³, standard set in national legislation. The minimum concentration of radon measured was 184 Bq/m³ and the maximum was 2588Bq/m³. It was discovered that indicators such as “age of home”, construction materials”, “pavement”, options for ventilation” and number of doors did not significantly influence the radon levels found in the interiors of the homes, pointing to the conclusion that soil composition, mainly that containing granite is the principal source of radon.

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An interdisciplinary research on pediatric asthma admissions using satellite based information on optical thickness of atmospheric aerosol triggers

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Keywords: Paediatric hospital asthma admissions, satellite remote sensing, aerosols, optical thickness

There are enough data demonstrating the association of aeroallergen levels, air pollution and weather conditions with asthma exacerbation and hospital asthma admissions (HAA). It has also been observed a wide international variation in the prevalence and severity of asthma symptoms. Understandably, because of the suspected sources and causes of asthma exacerbation, particular health conditions maybe more prevalent in the developed world than in developing countries. Research has suggested that there is a predominantly local aspect and a notable temporal and spatial variance in the incidence of HAA. While the impact of these disorders is expressed differentially in various population sub-groups and/or geographic areas, the strength of the above mentioned associations between specific outdoor environmental conditions and asthma exacerbations remains unclear. Atmospheric attenuation has been recognized, measured, and associated with cause and effect strategies in various ways throughout the evolution of the remote sensing sciences. Current approaches to understandings in the field have inspired its consideration as an index of HAA triggers.

This paper presents an early exploration of the relationship of atmospheric attenuation in terms of aerosol optical thickness (AOT) using satellite image contrast reduction comparisons (as a measure of AOT variations over time) between a reference image and a series of object images. These object images correspond in time to specific periods of observed HAA rates. Daily counts of HAA of the three main Children's Hospitals in Athens-Greece, recorded by the hospital registries during a 4-year period (2001-2004), were obtained. An evaluation of the correspondence of the variation in the relative AOT variation is found to suggest preliminary consistencies with the observed HAA flux. Given increased global environmental awareness and the adverse effects of certain worldwide economic developments, the understanding of HAA related mechanics is an important tool for health policy formation and execution. The application of these understandings on the part of public and private sectors can have significant applications for both the developed and developing nations of the world.

Acknowledge Funding Source: Professor Garry Higgs is currently in Greece under a Fulbright Foundation fellowship.

Joint Chinese-European investigation how Alternative Decarbonisation policies Effect public health and well-being in selected cities - JADE

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Keywords: greenhouse gas emissions, reduction policies, health impact, ecosystem impact, air pollution

On the COP 15 in Copenhagen in December 2009 a consensus was reached regarding the long-term objective of a global climate policy. However the unique chance to agree on binding policies with high environmental, health and well-being synergies was missed. Both GHG emissions and environmental exposures originate from the same sources. Hence the reward of alternative GHG reducing measures on public health, well-being and sustainability across different socio-economic groups, cultures and disparities must be assessed. Therefore, the aim of JADE is to develop a methodological framework and a series of target-aimed and/or specific policy-dependent scenarios to identify site-specific optima concerning GHG mitigation policies with regard to health and well-being in urban areas. After a current-state assessment, stake holder-driven site-specific scenarios will be identified, the changed environmental exposure of the urban population will be simulated with numerical models, and health and eco-system impact assessment will be performed. The transportation sector will be one focus, thermal efficiency and the impact on power production another. GHG reduction measures acting upon transport are anticipated to result in large health impact - air pollutants are emitted in close distance where people live. The role of classical fuel options such as coal, oil and gas as well novel fuels such as bio-fuels and technologies e.g. E-mobility will be addressed. The analysis will be undertaken in four selected cities in Europe and China representing rather different conditions (Budapest, Madrid, Beijing and Lanzhou). Stakeholder participation will guarantee a high reliability of the scenarios to be developed and analysed within JADE. The results of JADE shall be made transferable to other urban agglomerations. Therefore, the project will be conveyed to the relevant stakeholders in the scientific community and the public by workshops, conferences, reports and presentations ("open days").

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HENVINET expert consultation on health and policy implications of decaBDE

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Keywords: Environmental health, expert elicitation, decaBDE, stakeholder approach

Deca-brominated diphenyl ether (decaBDE) is a flame retardant widely used in products such as electronics and textiles. It is persistent in the environment, but differs from other polybrominated diphenyl ethers (BDEs) with respect to some important physicochemical properties. DecaBDE has therefore been less strictly regulated in many countries than other BDEs. Even if regarded less toxic, there are indications of toxicological effects, such as endocrine and neurodevelopmental disruption.

The aim of HENVINET is to establish a long-term environment and health network between researchers-stakeholders-policymakers in order to make relevant up-to-date information and the latest scientific opinion available for society. One issue in focus within HENVINET was decaBDE. An expert consultation to evaluate the state of the current scientific knowledge of decaBDE and its potential impact on health and policy considerations was organised by the consortium using a method recently applied for phthalate evaluation. Through two questionnaires and one expert workshop, the consultation aimed at identifying priorities for further action and arriving at a final expert advice for policy makers.

The results of the questionnaires and the workshop were presented as a short policy brief, summarizing the experts' recommendations and advice.

The experts agreed that there is a need for more research and monitoring of decaBDE to better support policy on this substance. Top three priority research areas were defined as:

1. The extent to which the substance is transformed to compounds with more tissue accumulating and toxic properties in the environment (OH-BDEs and BDEs with lower bromine content);
2. The extent to which humans and animals are exposed to the compound, especially from food and dust;
3. The extent to which decaBDE is transformed to more harmful substances in the human body.

Also suggestions to improve the current knowledge were to better organise research collaborations between publically funded institutions and universities at the European level. And in addition to publically funded research, industry should be required to provide more toxicological data.

Also, the experts considered that there is a need for information on alternative substances with putative lower risk than decaBDE.

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Health implications of HBCD – Results of an expert elicitation

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Keywords: Hexacyclobromododecane, HBCD, Endocrine disruptor, Expert elicitation

Hexabromocyclododecane (HBCD) is one of the major brominated flame retardants (BFRs) used to prevent different materials from catching fire. The HBCD concentration in the environment has increased since 2001. The major concerns about HBCD are its persistence and its potential for bioaccumulation, and there are indications of toxicological effects, such as endocrine disruption. Different countries use different policies regarding the production and use of HBCD. HBCD is one of the substances chosen to be evaluated by the Henvinet consortium. The aim of Henvinet is to establish a long-term environment & health network between researchers, stakeholders and policymakers.

An expert elicitation to evaluate the state of the current scientific knowledge of HBCD and its potential impact on health and policy considerations was organised by Henvinet using a method recently applied to evaluate phthalates (1), consisting of two questionnaires and one workshop.

The results from the questionnaires and the workshop arrived at concrete expert advice for policy makers and priorities for further action were identified:

- Experts agreed that more information is needed about the HBCD compound in order to better understand its health impact. This requires more investment in fundamental science as well as certain policy measures such as monitoring activities. The experts suggested more focus on three priority research areas: 1) Epidemiological and toxicological studies of HBCD 2) Concentration of HBCD in the target tissue, especially on individual HBCD isomers 3) Exposure to HBCD. The experts also agreed that better information on safety of alternative substances with lower risk than HBCD is needed.
- A short policy brief on the current situation with HBCD and the results of this Henvinet expert elicitation on HBCD was written aimed at decision makers.

The Henvinet method presented here is not intended as a substitute for Risk Assessment, but is meant as a rapid assessment tool aimed at highlighting different view points on key knowledge-related issues for policy making. The method was previously used within the Henvinet project on phthalates (1). The method was useful to identify priorities for further research on HBCD, as well as valuable recommendations for policy makers with respect to HBCD.

(1) Poster "HENVINET expert elicitation on health and policy implications of phthalates".

Acknowledge Funding Source: All experts responding to the questionnaires and attending the workshop are gratefully acknowledged.

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Health impact assessment of particulate matter (PM₁₀) and Ozone (O₃) in Mexico City Metropolitan Area

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Keywords: Health impact assessment, air pollution in Mexico City Metropolitan Area

Background: Health Impact Assessment (HIA) is an instrument for identifying the effect of policies, plans, programs, and projects on population health and health equity. HIA use information on exposure, baseline mortality/morbidity and exposure-response functions from epidemiological studies in order to quantify the health impacts of existing situations and/or alternative scenarios.

Objective: The aim of this study was to assess the health impact of exposure to particulate matter less than 10 micrometers (PM₁₀) and ozone (O₃) in Mexico City Metropolitan Area.

Methods: HIA is based on standard approaches to derive the number of adverse effects that are attributable to some established risk factor. The calculation requires three basic pieces of information: 1) Frequency or occurrence of a health problem in the population, 2) PM10 levels and 3) The quantitative information about the association between exposure to PM10 and the occurrence of health outcomes (concentration response function-CFR). The quantification of benefits was done by comparing the current burden with the one expected if air quality was at some lower levels. Geographic Information System was built to estimate the population exposure to PM10. To compare different estimates we select three different sources of CFRs: international meta-analysis, Mexico City studies and ESCALA data (ESCALA is a recent multicenter project that examines the association between health effects and air pollution in several cities in Latin America.)

Results: The reduction of current levels of PM₁₀ to the WHO standards would result in about 2306 (882-1499) fewer annual **deaths** using ESCALA CFRs. This reduction is more important in people older than 65 years with 1369 (1029-2184) avoided deaths and 265 (55-468) for >1 year. For ozone 631 (441-796) deaths per year could be reduced if the annual mean of 8-hour average maximum values was reduced to 50 ppb. The evaluation also included estimations of long term-effects on mortality and death due to respiratory, cardiovascular and brain's vascular causes.

Conclusions: The results of the study will provide useful information to policy makers for implementing management policies for the next 10 years.

Acknowledge Funding Source: Instituto de Ciencia y Tecnología del Gobierno del Distrito Federal

Chlorpyrifos and neurodevelopmental toxicity: Critical assessment and expert elicitation

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Organophosphate (OP) compounds are used worldwide in agriculture and gardening to control insect pests. They also have residential and indoor applications for pest control, especially for cockroaches and termites. OPs act by inhibiting acetylcholinesterase, thus affecting nerve function in insects, humans and other animals. Most of the animal and human studies published between 2000 and 2007 refer to the OP chlorpyrifos (CPF).

There are concerns about the safety of CPF in the environment. While previous studies have shown levels of CPF that are safe in adult animals, recent evidence indicates young animals and humans may be more sensitive to CPF toxicity. In young animals, CPF is neurotoxic and mechanistically interferes with cellular replication and differentiation. This leads to alterations in the synaptic transmission in neurons.

OPs are used frequently in Europe for pest control due to their low price and broad spectrum of activity. In 2003 they accounted for over 59% (4645 tonnes) of insecticide sales in the EU, with CPF the top selling insecticide (15.6%, 1226 tonnes). CPF was also one of the most widely used OPs in the US for pest control, but the US Environmental Protection Agency imposed a ban on the sale of CPF for residential use in December 2001.

The consideration of whether to ban OPs for domestic use in Europe is a complex process involving both health and lifestyle considerations. Moving from scientific data to policy interpretation is a nontrivial challenge, because public health risks are scientifically very complex. Scientific assessment of environmental health risks is faced with large, sometimes irreducible, uncertainties, knowledge gaps, and imperfect understanding, and may also have conflicting claims and scientific controversy.

In order to better inform policymakers of the scientific basis of any proposed action, an expert elicitation was undertaken to identify areas of the research in need of further examination. This study considers the environmental health effects of CPF exposure in utero and during childhood and its relationship with neurodevelopment. The results will be used to form the basis of a decision support tool which has the aim of preparing policymakers with the necessary scientific background to address the concerns surrounding OPs and their applications in the home.

Experts fear serious effects of a warmer climate on respiratory health

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Keywords: Climate change, experts, health impacts, policy making

For assessment of current scientific knowledge regarding climate change and health in 2009 we consulted 48 experts in the field of respiratory and environmental medicine, public health and epidemiology. All had recent publications listed in PubMed on asthma and air pollution or climate change, and had been studying European populations.

Sixteen out of 48 experts accepted to evaluate the causal model for climate change effects on respiratory health we had developed. There was an overall high consensus among the experts with the majority having a medium or high level of confidence in claims related to climate change and respiratory diseases. The consensus was high for all questions related to extreme heat and ground level ozone. Consensus was high also for claims stating that increased exposure to damp buildings and wet building material will increase the frequency of acute asthma and respiratory morbidity and that the increased concentrations of ground level ozone will result in increased population exposure. The consensus was lowest for questions related to dust mites and climate change.

Even if the results may be biased due to the composition of participating experts, the scientific literature clearly support increased exposure to heat and ozone to cause serious health effects. Water damaged buildings and indoor mold is also correlated with more respiratory illness.

At a final workshop with nine of the sixteen experts there was consensus that no important pathway was missing in the causal diagram that was evaluated, but that the relevance of different stressors and health risks could be different in different regions also within Europe. The workshop participants found it a problem that on the one hand mitigation and adaptation are sometimes in conflict. On the other hand sometimes they offer a win-win situation. For policy making such differences are important to take into account.

Acknowledge Funding Source: This study was part of the Henvinet Project

Predicting safe levels for estrogenic compounds based on in vitro estrogenic potencies and fate of the compound in the body.

Ans Punt*, Minne B. Heringa, Merijn Schriks, Albertinka J. Murk** and
Annemarie P. van Wezel

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***Presenting autor: Wageningen University, Toxicology group, The Netherlands, Tinka.Murk@WUR.nl*

Keywords: Estrogen, ER-luc reporter gene assay, rat uterotrophic assay, effect-based benchmark doses

In vitro assays capable of detecting ER-receptor activation provide a useful screening strategy for identifying xenoestrogens in a sample. In general, good correlations have been observed between in vitro estrogenic potencies and effect doses obtained with the in vivo rat uterotrophic assay, indicating that in vitro estrogenicity assays can be good predictors of in vivo estrogenic activity. In spite of this, limitations still occur in the in vivo predictive value of in vitro estrogenicity assays, since such assays do not take the kinetic characteristics of a compound into account that would occur in the in vivo situation. The present study investigates whether combining in vitro estrogenic potencies with kinetic characteristics of a compound can improve the in vivo predictive value of the in vitro assay. To this end, the effects of differences in serum albumin binding between compounds and the effects of differences in hepatic availability on the correlation between in vitro-based ethinylestradiol equivalencies (EE2EQs) and rat in vivo uterotrophic responses were determined. Results revealed that the correlation between the EE2EQs and the in vivo uterotrophic responses could especially be improved by taking differences in hepatic availability into account. Correcting the EE2EQs for both differences in albumin binding and hepatic availability did not further improve the correlation. The approach applied can form a basis for deriving effect-based benchmark doses.

Acknowledge Funding Source: KWR, Watercycle Research Institute

POSTER PRESENTATIONS
TOPIC 2 – DECISION SUPPORT TOOLS (DSTS)

Spatialization of air emissions in Piemonte

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The Region of Piemonte monitors the state of environment on its territory on a regular basis. One important issue to monitor is spatial distribution of air pollutants. Information on emissive activities are gathered every year in the Regional Emission Inventory, and emission amounts are estimated by means of the INEMAR model and methodology, developed by Regione Piemonte, CSI Piemonte and a cooperation of other Italian Regions. The output of the model is an estimation of total amounts of selected pollutants emitted in each municipality in one year. Data from the inventory are available on the internet by means of a searchable database IREAWEB.

Spatial representation of emission on municipality base, however, is not sufficiently detailed for purposes of Public Administration such as decision making an environmental planning. Since the Region disposes of a relevant patrimony of spatial information on territory, an effort was made to use such information to locate emission with better detail. Data sets corresponding to emission sources have been selected, such as mayor traffic roads, urban areas, industrial areas, landfills, crops, livestock etc., and a correspondence was defined between emission sources and spatial data sets.

Considering detail scale of available data and characteristics of air pollutant diffusion, it was chosen to locate emissions on a grid of 1 km of pace. Spatial data have been intersected with the grid and total emissions of each municipality have been distributed to cells, proportionally with the extent and type of spatial features included in each cell. The result is a set of maps representing spatial-spread of air pollutants. Several maps have been produced, each representing a combination of emission activity and pollutant. Maps are available in the internet through a web-GIS service.

After conducting the experimental work on the inventory INEMAR 2005, the work was repeated for the inventory of 2007 and the web service publishing the data was updated with the new maps.

Application of the ISHTAR Suite for the Assessment of Environment and Health Oriented Policies in 7 European Metropolitan Areas

Dr. Emanuele Negrenti

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The main objective of the ISHTAR (Integrated software for Health Transport efficiency and Artistic heritage recovery) Project (2001-2005) was the realisation of an Integrated Suite of models that integrates several software tools for the simulation of the effects of transport and land use policies on the urban environment, air quality, population health and artistic heritage.

The ISHTAR Project had four main scientific and technological objectives:

- The integration of a large number of software tools and the creation of specific modules for the simulation of key processes such as transport and its direct impacts on the urban environment.
- The achievement of a high spatial and temporal flexibility, for maximizing the possibilities of application from local short-term actions to widespread long-term policies.
- The development of specific modelling areas such as policies effects on citizens behaviour, the integrated 24 hours simulation of traffic emissions, noise and safety, the microscopic analysis of air pollution effects on health and monuments.

Starting from the simulation of the effects of the postulated measure on citizens behaviour in terms of daily movements, the suite calculation path goes through the modelling of transport, vehicles safety and emissions of pollutants and noise, pollutants dispersion and noise propagation, exposure to pollutants, noise and accidents and related risk assessment, monuments degradation, up to the overall comparison of the alternative scenarios in terms of cost-benefit or multi criteria analysis. The software modules are integrated by a Software Manager that controls the tools execution, and is linked to a User Interface, a suite Database and a commercial GIS.

The ISHTAR Suite was tested in the seven metropolitan areas involved in the FP5 EESD Programme ISHTAR Project: Athens, Bologna, Brussels, Graz, Grenoble, Paris and Rome, with the analysis of different measures and policies. The main results of these case studies and the lessons learned in view of future refinement and exploitation of the tool are described in this work. The case studies include new road infrastructure analysis in central Graz, Bologna Province and Attiki region, traffic banning measures in metropolitan Brussels area, Paris (car free day) and central Rome, and measures in favour of public transport in Grenoble. The testing led to the solution of a number of modelling and software issues, and allowed to qualitatively assess the modules of the ISHTAR Suite.

These applications gave several positive indications on the performance of single tools and of the whole integrated software, but also put into evidence areas of improvement as it regards models refinement and user friendliness. In the near future the ISHTAR suite will be available for use in Europe and elsewhere for advanced planning and evaluation of urban and metropolitan environmental policies having health protection as the main goal.

Key References:

Negrenti E. & Zaini D. 2002 ISHTAR Project Web Site : www.ishtar-fp5-eu.com

Negrenti E. & Agostini A. 2005 : ISHTAR Project Final Publishable Report – Deliv. 11.6

Modeling Pareto efficient PM10 control policies in Northern Italy to reduce health effects

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Keywords: External costs. Health impacts, Integrated assessment modeling, Pareto efficiency, PM10 air quality policies

High PM10 concentrations can cause human health problems, both related to short-term and long-term exposure to particles. In this work the impact of efficient PM10 control problems in Northern Italy is assessed by means of a two-stage methodology. In the first stage a multi-objective optimization approach is applied. The multi-objective problem defines two control objectives (the emission reduction costs and the air quality index) to be minimized varying the decision variables (precursor emission reductions). The solution of the multi-objective problem are the Pareto efficient PM10 control policies. In the second stage, the ExternE methodology is applied to estimate health impacts and external costs for the efficient emission reduction scenarios computed in the first stage. The methodology has been applied over Lombardia region, one of the most polluted areas in Europe.

Acknowledge Funding Source: The research has been developed in the framework of the Pilot Project QUITSAT (Qualita' dell'aria mediante l'Integrazione di misure da Terra, da Satellite e di modellistica chimica multifase e di Trasporto – contract I/035/06/0), sponsored and funded by the Italian Space Agency (ASI). The work has been also developed in the frame of EU NOE ACCENT (Atmospheric Sustainability). The authors are grateful to Prof Giorgio Guariso (Politecnico of Milano, Italy) and to APD-IIASA staff (Atmospheric Pollution and Economic Development - International Institute for Applied Systems Analysis) for their valuable suggestions.

SILAM: Numerical modelling system for emergency preparedness and the key components of chemical weather

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Keywords: Dispersion modelling, atmospheric chemical composition, chemical transport models

The Poster presents the current status of **emergency** and chemical composition modelling system SILAM. The system uses input information about anthropogenic, biogenic, natural, and complex, such as wild-land fires. The dispersion tools in the framework allow to choose between the Eulerian and Lagrangian dynamic kernels. The chemico-physical modules allow computations of radioactive pollutants (the model database includes 496 nuclides with decay chains, dose rates and doses targeting up to 23 organs of the human body); basic SO_x-NO_x-NH_x-O₃ chemistry; size-segregated aerosol compounds, natural allergenic pollutants, production of sea salt; and probabilistic estimates of plume dispersion expressed via volume- and area-of-risk.

The three main parts for modelling the key components of the chemical weather modelling are: the anthropogenic emission databases with simple temporal disaggregation, biogenic emission models for evaluating emission of natural aerosols and their precursors, and the Fire Assimilation System (FAS) jointly developed by Finnish Meteorological Institute and Russian State Hydrometeorological University. Two FAS versions are based on (partly) independent satellite products from the MODIS instrument: Temperature Anomalies (TA) of the Rapid Response systems (hot-spot counts) and the Fire Radiative Power (FRP). The observed quantities – the pixel absolute temperature and radiative emissivity – are converted to emission fluxes via empirical emission factors.

The products are available in near-real time and thus are utilized for the operational evaluation and forecasting of the atmospheric composition and exposure over Europe. Information from all three sources is consumed by the chemical transport model SILAM that is used in both forecasting and re-analysis modes. A few representative examples will be shown about actual events happened during recent years.

Acknowledge Funding Source: EU-GEMS and MACC, ESA-PROMOTE, Finnish Academy-IS4FIRES and POLLEN projects

POSTER PRESENTATIONS
TOPIC 3 – E&H PROJECTS' EXPERIENCE WITH POLICY-SCIENCE
INTERFACE

HENVINET Networking Portal: Web community joining health and environment professionals

HENVINET Project Consortium

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Keywords: Social networking, communication, health, environment, policy, science

The HENVINET project has the primary goal to support informed policy making by integrating environment and health issues, for the greater purpose of protecting the health of populations and individuals. To facilitate this integration, the project has created a networking portal which is designed specifically for joining the global environment and health community. With a range of innovative tools for locating and accessing expertise, sharing knowledge, views and networking with peers, HENVINET empowers a multi-stakeholder approach to addressing the most pressing environment and health issues at hand. The HENVINET portal provides environment and health professionals and stakeholders anywhere in world with the ability to:

- *Network with peers:* Engage with a community of scientists, policymakers and stakeholders to share expertise, views and information.
- *Access the experts:* Search for and pinpoint specific expertise, and efficiently communicate and discuss concerns and specific topics with renowned experts.
- *Tackle global challenges:* Effectively collaborate within self-forming communities and forums that bring together a relevant portfolio of experts and stakeholders to address the issues at hand.
- *Set the agenda:* Shape the agenda of the Environment and Health community by participating in communities and forums discussing hot-topics of today and tomorrow.
- *Share opportunities:* Advertise conferences, symposia, research calls, job opportunities and the like to a broad range of professionals.

The networking components of the portal will be presented, along with how these components are envisioned to join environment and health professions in an interactive web-based community.

Acknowledge Funding Source: EU FP6

Psychotropic Substance Contents in the Air Across Italy. Concentration Levels and Relationships

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Keywords: Psychotropic substances; atmospheric particulate; organic toxicants.

Two in-field campaigns were performed in winter and summer 2009 to evaluate the psycho-active substances content in airborne particulates across Italy. Twenty eight sites were investigated in the first campaign, and thirty nine in the second. Cocaine was found almost everywhere, although some localities were rural or suburban. The maxima were recorded in Milan in both periods (yearly average ~0.20 ng/m³), and high values in the Northern cities and in Rome (~0.1 ng/m³). Δ^9 -tetrahydrocannabinol, cannabidiol and cannabinol usually affected the air at lower extents than cocaine. The concentrations detected of nicotine (0.4÷121 ng/m³) and caffeine (0.04÷52 ng/m³) exceeded those recorded before. Drug concentrations were compared with those of n-alkanes, PAH and PM10 affecting the atmosphere. The drug behaviours seemed to be independent of those of any organic toxicants. Looking to meteo-climatic situation, the drug concentrations were usually lower during summer, as a consequence of the low boundary layer heights typical of winter. Nevertheless, the summer decrease was much lower than that characterizing other particulate compounds. Further investigations are necessary to elucidate if illicit substances modulate with the abuse prevalence and to assess the true impact of meteorology influencing the pollutants dispersion and deposition.

Acknowledge Funding Source: Italian National Research Council, Institute of Atmospheric Pollution Research (free research)

Health Effect Screening

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Keywords: Health effect, screening, impact assessment, scenarios, environmental exposure

What is the Environment Health Impact Assessment?

The Environment Health Impact Assessment (EHIA) is an instrument that provides advance insight into the various factors that can affect the health of residents in a city. An EHIA provides a clear picture of health-related problems and opportunities with regard to urban development projects, changes in spatial planning or infrastructure, and national restructuring projects.

Tool developed in 2000, 5th update 2010, commissioned by government departments for environment and health

- For municipal health services
- Aim: to let local government take health into consideration in decisions concerning urban planning, urban restructuring and traffic circulation plans.
- How: providing insight into environmental health quality by a visual presentation on maps
- See at a glance where problems arise and where opportunities lie
- Helps decision making by providing insight
- Enables a healthier design of the living environment
- Avoid foreseeable future problems (public concern, financial)

How does it work?

- Survey of all relevant environmental sources and factors (exposure data, population data)
- Determine the environmental burden for every factor
- Assign a health impact assessment score (EHIA-score)

Environmental factors:

- Air pollution
- Noise
- Odour
- Electromagnetic fields
- External safety risks
- Soil pollution

Sources assessed in EHIA:

- Industry
- Road traffic
- Railway traffic
- Shipping traffic
- Aircraft traffic
- Soil
- Overhead powerlines

Acknowledge Funding Source: Ministry of VROM, the Netherlands

Needs and concerns in support of policy making in the field of environment and health expressed by Mexican stakeholders

Urinda Alamo-Hernández, Horacio Riojas-Rodriguez

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Keywords: Support of environmental and health policy making; Mexican stakeholders.

As part of HENVINET's activities we performed semi structured interviews in order to know the needs and concerns aimed to support policy making in the field of environment and health in Mexico (at federal and local level). In this work we present the main results.

General comments on priorities: According to the information provided, there is a need for: Available and accessible scientific evidence about exposure to contaminants. Information on contaminated passives sites characterization, and proper methodology to diagnose and prioritize environmental risks. Hazardous waste management procedures. A national inventory of chemicals. Having clear regulation and legislation processes and improving the communication between researchers and decision makers.

Feeding information on health effects into the policy making arena: These depend on the availability and sensibility of policy makers. First, to have access to brief and concise information that could be understood by both the technical and political side. Second, it's important to have the language adapted to secretaries, deputies and advisors in the presidential area. Last, the orientation regarding where the actions should be directed should not be neglected.

Emerging issues: Persistent organic compounds, accidental spillages, hydrocarbons basic sanitation, electronic residues, child health, nanomaterials.

Priority areas for research: water, chronic degenerative diseases, multi-routes of exposure

How to prioritise research: by an integral diagnosis of environmental risks, considering which are the most prevalent pollutants, by an opened and transparent process of consultation between researchers, public sector, industry, civil society and NGOs.

Obstacles for action: Ignorance of what environmental health is; and lack of enough attention in the political agendas; lack of integral norms and policies; low research budget; lack of acceptance and participation of the industrial sector; and international negotiation, especially with USA.

Other important issues: Information addressed to children should be included as well as information assessment; and have the information available in Spanish.

“Approaching the European scenario and getting to know the policies and risk management in developed countries will help us to adapt them to the reality of the developing countries' context. And in this way it will contribute to an improved management of these countries”.

Acknowledge Funding Source: HENVINET

Enhancing the Impact of 'Environment and Health' Projects and their Relevance to Policies and Informed Decision-making

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Keywords: HENVINET, European policies, priority diseases, European Environment and Health Action Plan.

Health and Environmental Network (HENVINET) is an European Union (EU) project; which aim to review, exploit and disseminate knowledge on environmental health issues based on the research and practices for wider use by relevant stakeholder. Following HENVINET objectives, the current work assess the strategies to bring together the ongoing and recently completed 'environment and health' research projects to support the relevant information process for the implementation of the European Environment and Health Action Plan (EHAP). The poster specially focuses on projects related to the priority diseases identified by the EHAP i.e. asthma and allergies, cancer, neurodevelopment disorders and endocrine disrupting effects. The poster also highlights the relevance of Decision Support Tools (DST) and the need of feedback process for planning and implementation of relevant policies. Furthermore, special attention was paid for the development and strategic linking of research priorities (including gaps) and their implications for European Research Framework Programmes (FPs) in relation to 'environment and health' projects.

Human biomonitoring in an Italian high environmental risk area: study design and results delivery, communication and ethical issues.

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Keywords: human biomonitoring, communication, recommendations, ethics

In the high environmental risk area of Gela, Niscemi and Butera (South Sicily) an epidemiological study using human biomonitoring (HBM) data was planned in year 2007, in the framework a technical assistance programme developed by the World Health Organisation on behalf of the Sicilian Region, named SEBIOMAG. The Gela industrial area includes chemical production plants, an oil refinery plant and a power station, burning coal derived by refining process.

The SEBIOMAG study had the objective of identifying the exposure of the community to environmental pollutants, to promote tailored remediation activities and to establish the knowledge base for a permanent environmental health surveillance system.

If compared to the other highly polluted sites, the Gela area is a case in which many important data on environmental matrices and health outcome are available. However the data are scattered, being a clear example of the lack of coordination between environment and health data collection and management. A multidisciplinary working group has been established to study present pollution-exposure-effect data, to identify further information needs and to help HBM data interpretation.

Communication activities had a crucial relevance during the SEBIOMAG HBM survey and the multidisciplinary group developments, ranging from relation-building with local communities and social stakeholders, information collection and diffusion, public meetings and training activities. The production of information materials, a detailed questionnaire including a section on risk perception and information sources, as well as the legal forms to be signed by HBM survey was completed by meeting with groups of citizens, to examine comprehension and readability.

The result were given to each of the 270 donors during three days spent in Gela by the whole SEBIOMAG research group, and a public conference with decision makers was also organised. 60 PCBs, some PBDE and heavy metals were monitored. Among them arsenic appeared as the most important in terms of community exposure: 20% of donors had level of arsenic higher than the baseline (known from comparable Italian places) in blood and urine samples.

A detailed report on the whole survey was delivered to the competent authorities, including the following recommendations: to repeat analysis in urine to permit arsenic speciation; to monitor air, tap water and food to understand the actual exposure source; to evaluate individual susceptibility.

In absence of decisions for continuing the studies and for primary prevention measures by public authorities, ethical issues concerning the donors and the community can affect future studies and public health activities. The ethical questions posed by researchers, to be developed in the presentation, are linked to study design, results release and communication.

Acknowledge Funding Source: Sicilian Region trough contract with the World Health Organisation funded SEBIOMAG survey

Urban Environment: Integrated Assessment of Environment and Health

David Ludlow

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Keywords: urban environment; environment and health impacts; integrated assessment and policy

More than three quarters of European citizens live in urban areas, therefore ensuring a high quality urban environment is critical for human well-being. The environment in which people live plays a fundamental role in people's health, but this environment is a complex system of interactions between exposure to pollutants eg air pollution, noise, poor quality water, chemicals etc, and other environmental, economic, social and health aspects. For example, urban air quality problems and climate change share common drivers, such as urbanization, population growth, mobility, energy consumption, with a range of impacts on human health.

Despite gaps in scientific understanding and remaining uncertainties, a wide consensus on the existence of links between certain diseases and the environment justifies taking preventative and precautionary measures to reduce environmental burdens to protect human health. The Thematic Strategy on the Urban Environment (COM(2005) 718 final) emphasises the environmental challenges facing cities and the significant consequences for human health, the quality of life of urban citizens and the performance of the cities. The Strategy aims to improve the urban environment, making cities more attractive and healthier places to live. Furthermore, as urban environmental quality is the result of drivers in many areas at different scales, policy response at all governmental levels ranging from local to European are necessary.

This growing recognition of the complexity of interactions between environmental factors and their impacts on human health within the urban socio-economic and cultural context calls for a more integrated approach in developing and implementing responses. More integrated and balanced solutions linking all levels of governance from EU to local, offer opportunities to tackle multiple problems, creating new synergies.

For example, local city based examples of an integrated approach seem to be successful in reducing both local air pollution and noise levels. Significant synergies and co-benefits are also possible through a concerted consideration of air quality and climate change policies. Improved coherence of air legislation with climate change policy actions is needed to fully capture synergies that exist between air pollution and climate change mitigation to better protect human health.

Acknowledge Funding Source: HENVINET Health and Environment Network

Aphekomp - Lessons from Local Experiences in Bridging the Gap Between Science and Air Quality Policies

Yorghos Remvikos, Catherine Bouland, Sylvia Medina on behalf of the Aphekomp network

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Keywords: Aphekomp; Air Pollution; Stakeholders; Uncertainties

Public decisions regulating environmental issues such as air quality rely on the proper integration of complex scientific evidence. Aware that pressing gaps remain in stakeholders' understanding of the continuing threat on health represented by air pollution, the Aphekomp project aims to develop and deliver reliable and actionable information and tools on the health impacts and monetary costs of air pollution, so decision makers can set more effective local and European policies, health professionals can better advise vulnerable groups and individuals can make better-informed decisions.

Policies regulating atmospheric pollution may seem relatively straightforward to conceive from the human health perspective. But in reality, decisions imply the agreement on multiple criteria that are often divergent. Preferences can be influenced by individual, institutional and ideological dimensions of multiple participants which often remain implicit.

Since Aarhus convention's enforcement even more, the decision-making processes increasingly involve stakeholder participation and offer possibilities to study both the features of the science – decision interface and the influence of stakeholders. Stakeholders' perception and needs have been the focus of several investigations, but decisive factors are still to be uncovered.

Aphekomp's work package 7 focuses on sharing knowledge and uncertainties between scientists and stakeholders in an attempt to improve the science/policy interface. Methods and tools are being developed and applied to local case studies. A comparison of two examples will be presented:

- A multicriteria assessment of the Air Quality Action Plan of the Paris Metropolitan area using deliberation support tools; this was performed by participants to the various working groups that contributed to its elaboration. The focus was on compliance to existing standards and allowed to generate debate around different issues such as environmental inequalities or quality of life.
- The mechanism and results of a citizen panel organised in the Brussels Capital Region to integrate actions towards the implementation of a regional framework of actions in order to improve air quality. This work was also structured as a multidimensional and long-term strategic vision.

Acknowledge Funding Source: A multicountry project working in 25 cities across Europe (EC Grant Agreement 2007105) coordinated by InVS in France and managed by a consortium of European institutions that investigate air pollution and its impact on health

Problems of pesticides/ chemicals regulations in developing countries

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Keywords: Pesticide regulations, chemical regulations, developing countries

Pesticides are dangerous chemicals that are designed to kill and in their use the fact called pesticide dilemma has always been around and created lots of controversy. The dilemma which is about having different health and environmental hazardous effect created a wide scientific research by academics, governments, corporations and regulatory agencies in developed world to justify their use. In recent decades the problem turned to be wider because many other chemicals other than pesticides entered the daily life of people. This resulted in development of a very careful laws and regulations in developed world to avoid consequences but in developing countries and countries in transition the scenario is different. Most of these developing countries are blind consumers of these pesticides/ chemicals without proper regulations so disastrous problems like 25 millions case of pesticide poisoning/ year only in agricultural workers started to happen in these countries following their unregulated use of these compounds. Pesticide/ chemicals regulations are very important and developed countries always have a big plan to prepare, renew and enforce them but for developing countries different factors are preventing them to have these regulations and to enforce them. These problems like lack of proper infrastructures, lack of risk communications etc. are so deep that in recent years ended in those big figures of poisoning/ suicidal cases and environmental problems. This situation ended to more exposure of people to a wide variety of pesticides/ chemicals in developing countries compared to developed World. Then what would be the solution? Is there a simple solution for this big problem? Could we bridge the gap between North and South to solve the problem? Perhaps a Global Harmonization System (GHS) for pesticide/ chemical regulations would solve the problem to some extent. One important key issue would be capacity making/ ICT work and more and more involvement of Civil Society Organizations (CSO) and NGOs of developing countries in some important issues like pesticide/ chemical regulations. In recent years development of REACH laws and regulations in Europe opened a door of hope to solve the problem in developing countries.

Acknowledge Funding Source: I am very proud to have been able to communicate with globally known pesticide/ chemical regulatory people and agencies and for most with different PAN sections in the World (PAN-North America, PAN-AP Asia Pacific, PAN-Africa, PAN-Europe, PAN-Germany), EPA, DPR, PMRA, REACH, CFIA, David Suzuki Foundation in Canada in the past 10 years.

I acknowledge and I appreciate different NGOs in Canada and especially in Ontario for their generous information/ communications about these important issues. I spent all these years in absolute poverty in my country Iran and in Canada (2003-2008) following my goal to help people and environment globally.

Annex 1
Scientific Programme



ANNEX 1 – Scientific Programme

Approaching complexities in environment and health

HENVINET final workshop 14./15.04.2010, Renaissance Brussels Hotel, Rue du Parnasse 19, 1050 Brussels

Day 1		
08:30-09:00	<i>Registration and welcome coffee</i>	
09:00-10:45	Session I, Conference room Essen Chair: Dr Alena Bartonova & Dr Peter van den Hazel Complexity in environment and health – approaches and experiences Key note address: Dr Sylvia Medina, InVS, France Addresses: Dr George Morris, NHS Scotland, UK Dr Adrienne Pittman, AFSSET, France, ERA-ENVHEALTH	Poster exhibition, Conference room MADRID Topics for posters: 1. E&H projects 2. Decision support tools 3. Communication – policy-science interface
10:45-11:15	<i>Break</i>	
11:15-12:30	Session II, Conference room Essen Chair: Dr Aleksandra Fucic Continuation: Complexity in environment and health Dr Peter Pärt, IES JRC HENVINET overview <ul style="list-style-type: none"> - Overview: Dr Alena Bartonova, NILU, Norway - Causal diagram examples: Karin Zimmer, NVH, Norway - Complexity issues: Dr Hans Keune, University of Antwerp, Belgium 	
12:30-14:00	<i>Lunch, Foyer 2</i>	Poster exhibition, Conference room MADRID
14:00-15:30	Session III, Brussels Ballroom Chair: Dr Marco Martuzzi Continuation: HENVINET overview Stakeholder communication: Dr Peter van den Hazel, HVDGM, The Netherlands Tools for practice INTARESE toolbox: Prof. Rainer Friedrich, Univ. Stuttgart, Germany HEIMTSA and 2-FUN toolboxes: Dr Dimosthenis Sarigiannis, IHCP JRC HENVINET Decision Support Tool repository: Dr Emanuele Negrenti, ENEA, Italy	

15:30-16:00	Break	
16:00-17:00	Session IV, Brussels Ballroom Chair: Dr Peter van den Hazel Communication strategies for environment and health Introduction: Dr Peter van den Hazel, HVDGM, Netherlands and Alison Cohen, Fulbright-Schuman grantee/Brown University Discussing modes of communicating environment and health issues to different stakeholders	
19:00	Dinner, Restaurant “l’Atelier”	
Day 2		
09:00-10:30	Workshop I, Brussels Ballroom Chair: Dr Aleksandra Fucic & Dr Bertil Forsberg “Environment & health complexities: challenges for the near future” Dr Bertil Forsberg, University of Umeå, Sweden Dr Aleksandra Fucic, Institute for Medical Research & Occupational Health, Croatia Prof. Qamar Rahman, Integral University, Lucknow, India Dr Milena Horvat, Jožef Stefan Institute, Slovenia Dr Eva Csobod, REC, Hungary Dr Marco Martuzzi, WHO Rome, Italy	Poster exhibition, Conference room LUXEMBOURG
10:30-11:00	Break	
11:00-12:30	Workshop II, Brussels Ballroom Chair: Dorota Jarosinska & Dr Hans Keune “Interaction with the policy field” Dr Hans Keune, University of Antwerp, Belgium Dr Karen van Campenhout, Flemish Government, Belgium Dr Ingvar Thorn, Sweden	Poster exhibition, Conference room LUXEMBOURG
12:30-13:30	Lunch, Café Parnasse	

Annex 2
List of Participants

ANNEX 2 – List of Participants

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