



# **Report 2011-1 Environment and Health**

**EUPHA report 2011-1**

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The European Public Health Association (EUPHA) is an umbrella organisation for public health associations in Europe. At the moment, EUPHA has 72 members from 42 countries and includes more than 14,000 public health professionals.

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## 1. Introduction

For several decades, environmental changes have impacted the health of Europeans. Over the last two decades, the environment has become increasingly more complex. Today, the links between health and environment have never been so evident and the time to act is here and now.

In this report, we – the European Public Health Association – highlight what has been done so far and who has been active at European level in the field of environment and health. At the end of the report, we formulate some conclusions in our strategic four pillars.

## 2. A long way back

In the 1990s, numerous initiatives were developed by different actors. Many of these initiatives proved quite successful and these first international and national efforts to reduce or even eradicate environmental risk factors have already shown positive effects on the health status of Europeans.

An excellent example of a successful initiative is the ban of petrol lead, which led to a 90% reduction of lead emissions and was accompanied by a significantly lower level of lead in our children's blood (1). Other success stories include the substantial reduction of the burden of food borne and water borne diseases (2); and the remarkable results of the policies for the reduction of nitrates and, above all, sulphur dioxide in ambient air (3).

The ban on leaded petrol led to a 90% reduction of lead emissions, which is already reflected in the lead levels in our children's blood (1).

Other initiatives from the 1990s are beginning to pay off, and the first data are promising. For instance, the national bans on indoor smoking have been found to exert effects on health outcomes already, after a few months in the countries where they were introduced (4). Data available on PM10 (particulate matter smaller than 10 micrometer in diameter) monitoring from the 1990s show that a significant reduction in pollution has been achieved in the previous decade (1).

A disadvantage to this vast number of initiatives was a lack of coordination, overlap and limited exchange of experiences. In contrast, the years between 2000 and 2010 displayed a gradual shift towards a more cautious model of activity, with fewer actors and more coordinated efforts which are more tailored to the by now better known needs of the Europeans, to live in health conducive environment, and above all, more harmonized. This seemed to be influenced by two factors;

1. National governments were increasingly willing to comply with international guidelines and agreements, and to cooperate with each other. The efforts of the international actors described below, certainly influenced this.
2. The general public became more aware of environmental risks. On the one hand, this led to a clearer knowledge of what the general public needs and wants, on the other hand, the potential of citizen empowerment needed accurate information and knowledge sharing.

The years 2000-2010 also showed some hardships ahead. For many reasons, progress has slowed down:

- Hazards that had seemed easy to control proved that they were not defeated, and lack of constant attention and suitable methods may result in their return.
- Society has become more diversified. Environmental changes especially affect certain population groups and health inequalities will increase.

- New threats have come up, some of them did not previously exist, like those associated with the global climate change, others we did not know. All these new threats need action to be planned, thereby diversifying the fields related to environmental health.
- The potential of the traditional strategies to address environmental hazards has been almost exhausted. The new risks, or the new forms of old risks, call for new strategies and methods, for practice and policy as well as for research.

Today, there seem to be several reasons to remain active in the field of environment and health. According to WHO, more than 1.7 million annual deaths (18% of all deaths) are attributable to environmental factors in the European Region. The environment accounts for an estimated one third of the total burden of disease for children and adolescents aged 0–19. Well-designed environmental health interventions could reduce total mortality in the Region by almost 20% (5).

The burden of disease is heavily influenced by multiple environmental factors which have been steadily on the increase.

- New studies among children indicate that exposure to airborne pollutants increased the prevalence of respiratory symptoms. Asthma has become the most common chronic disease in children and is one of the major causes of hospitalization for children aged under 15 years. And, despite falling rates, still 12% of infant deaths in Europe are caused by respiratory diseases. (6).

The increase of asthma and allergies has enormous social and economic costs, including a significant impact on health care systems

- There is now evidence concerning the adverse effects of air pollution on pregnancy outcomes and infant deaths (7).
- Over 92% of the urban population, for whom relevant air quality data are available, live in cities where the WHO air quality guideline value for PM10 is exceeded,. This is a worrisome finding if considered in conjunction with studies that reveal that current exposure to PM from anthropogenic sources leads to the loss of 8.6 months of life expectancy in Europe and accelerate as many as 500,000 deaths per year in Europe (1).
- High ozone concentrations above 70 microg/m<sup>3</sup> are associated with approximately 21,000 deaths and 14,000 hospital admissions annually in the member states of the EU since 2004 (8).
- A recent EU assessment suggests that as many as 1 in 20 people in the EU are exposed to higher levels of methyl-mercury than the EU allows (9).
- There is increasing evidence to suggest that the two main causes of mortality in Europe (cardiovascular diseases and cancer) are influenced by environmental factors (1).

New challenges are now posed by new risk factors, or risk factors whose impact on health is little known, like endocrine disruptors, climate change, nanotechnology containing products and electromagnetic fields.

### 3. International actors: activities

A range of International actors is active in the field of environment and health. In this section, we describe some of the main actors and their activities.

### **3.1. WHO Europe**

The European Region of the WHO has gradually taken on a leading role in boosting the efforts of nations toward improving the ways they address environmental risk factors. Their main vehicle is the European Environment and Health Process and includes the first European Charter on Environment and Health in 1989, the Charter on Transport, Environment and Health, adopted by the Third Ministerial Conference on Environment and Health in London, 1999, and the Children's Environment and Health Action Plan for Europe, produced at the Fourth Ministerial Conference on Environment and Health in Budapest, 2004. Much has been accomplished in terms of increasing capacity and awareness of research and policy on environmental health. The European Environment and Health Process has a strong focus on inequality and disadvantaged population groups as well as a target-oriented approach. In 2010, some interesting results were published in the progress assessment.

The process is centered on four Regional Priority Targets:

1. Reduction of mortality and morbidity from gastrointestinal disorders by access to safe and affordable water and sanitation;
2. Reduction of mortality and morbidity from accidents and injury and lack of adequate physical activity;
3. Reduction of prevalence, incidence, mortality and morbidity from respiratory diseases due to outdoor and indoor air pollution, with particular regard to asthmatic attacks;
4. Reduction of morbidity, mortality and disability from exposure to hazardous chemicals, physical agents like excessive noise, persistent organic pollutants (POPs), hazardous working environments.

The Process provides a framework that has been increasingly used as reference by national and international authorities that undertake initiatives in environmental health in Europe.

### **3.2. The European Commission**

The impact and the authority of the European Union in the field of environmental health has been steadily growing: the EU regulations and standards are increasingly followed even by European countries outside the EU.

Over the last few years, the European Commission is implementing the WHO's CEHAPE programme and completing it with a large number of additional goals and initiatives.

In June 2003, the Commission adopted the European Environment & Health Strategy, with the goals of reducing the burden of disease caused by environmental factors in the EU, identifying and preventing new health threats caused by environmental factors and strengthening EU policy-making capacity in this area.

The Strategy was followed up by the European Environment & Health Action Plan 2004-2010 (10) which stressed the need to develop a good information base, including a coordinated approach to human bio monitoring, and the necessity to strengthen research on environment and health with the aim to make the assessment of the environmental impact on human health more efficient and health promotion and communication more effective.

The plan was marked by a clear economic perspective, although the four priority areas: respiratory diseases, neuro-developmental disorders, cancer, endocrine disruptors, were health-related. Again, the children are considered the first category to protect from environmental risks, and their increased susceptibility is given due consideration.

Both the Strategy and the Action Plan are supported from the other EU institutions. The mid-term review, conducted in 2007, has disclosed that, despite difficulties in bringing forward projects

involving a high number of stakeholders and institutional actors, they may have succeeded in creating a series of networks and information systems that are expected to play a decisive role in the research and practice of the next decade.

The publication of the final results of the Action Plan and the definition of the objectives of the next cycle of the Strategy deserve careful consideration, as they will be of interest to everybody concerned in Public Health in Europe.

Recently, the activities in the field of environment and health by the different EU Commissions has been reduced. DG Environment has transferred the work on environment and health to DG Sanco. The integration with other relevant fields is undermined by this direction of policy management.

### **3.3. The European Environment Agency**

In coordination with the Environment and Health Strategy, the European Environment Agency has been developing initiatives dealing with assessment and sharing of information relevant to Environmental Health that, in conjunction with the WHO'S NHIS, could represent the starting point of a redesign of environmental policy in Europe: the Shared Environmental Information Systems. This initiative aims to connect existing information systems in Europe and to, make them available via online information services, which also represents an occasion to modernize environmental reporting at national and international level.

The European Environment Agency has been involved in the E&H cooperation as an independent provider of information and assessments, and by framing the E&H analyses. Global environmental and climate change, unsustainable production, consumption and resource use, and degradation of ecosystem services, call for new approaches of E&H management and for broadening the information base. EEA has been participating in collaborative projects towards a European E&H information system to support these new approaches. Currently, the EEA is exploring the applicability of the Shared Environmental Information System concept for E&H issues. These developments will contribute to activities focused on turning and using environmental information into services, relevant also for public health.

### **3.4. EUPHA**

With the 2009 Conference in Lodz, EUPHA has addressed head-on the topic of human ecology and health, where:

- We stressed the need for our discipline to adapt to the current challenge of global environmental changes and develop an integrated ecologic perspective (11,12). The conference revealed concern of seeing existing inequalities worsen (13), with the subsequent implications as regards social justice issues in policy-making (14).
- We have started to explore the implications of an ecosystem perspective in public environmental health, considering previously ill-defined influences and relationships between the environment and the health status of humans (15), as well as evaluating the opportunity of stronger links between nature conservation and health protection activities (16).
- We have remarked that we may not know as much as we believed about such a subject as the transmission cycles of infectious diseases (17).
- We have entered into a new phase of our interest in the field of urban health, beginning with its definition and with the assessment of the status of international urban health (18,19).

- We have reviewed the progress of the Environment and Health Process in Europe, celebrating its 20<sup>th</sup> anniversary, and of the latest EU Action Plan on Health and Environment (2004-2010) (20).

The SPHERE (strengthening public health research in Europe) project has successfully monitored the features of European research in this field, disclosing imbalances between countries and between different research sectors that need to be addressed by redesigning our research priorities (21).

### **3.5. Health and Environment Alliance (HEAL)**

HEAL supports precautionary health and environment policy within two main frameworks: the EU Environment and Health Strategy and Action Plan and the WHO Pan European environment and health process, which includes the Children's Environment and Health Action Plan for Europe.

Moreover, HEAL serves as the health sector representative on the European Environment and Health Committee EEHC, which brings together representatives of the ministries of environment and health as well as stakeholders.

HEAL aims to highlight this preventative approach in the overall EU strategic discussions, such as the Europe 2020 strategy, and to have environment and health concerns integrated into all relevant policies, such as action to mitigate climate change, the reform of the Common Agricultural Policy, resource-efficiency and transport-related issues.

Specifically, HEAL encourages decision-makers to work to a dedicated vision on where the EU should be going in terms of protecting health and the environment. This is why HEAL calls for a second EU Action Plan on Environment and Health, as well as a 7th EU Environment Action Programme, to ensure that health and quality of life receive central political priority and funding. Such dedicated programmes are also necessary to ensure that recent commitments made as part of the WHO European Region environment and health process come to life at EU level.

In all the activities, HEAL puts the spotlight on protecting the health of children, pregnant women and other groups who are more susceptible to environmental pollution (22).

## **4. Four challenges for environmental public health**

### **4.1. Global climate change**

In the last twenty years, climate change has moved from being a matter for discussion and debate to being a concrete reality. Alterations to the environment and the ecosystems have been quicker than our understanding of it and our capacity to cope with them.

The 2003 heat waves in Europe caused more than 70'000 excess deaths (23).

A recent study by the Karolinska Institute in Sweden has clearly identified the mechanisms responsible for increased health risks: direct heat exposure, increased air pollution, increased chemical exposures, reduced food access, extreme weather conditions and vector-borne disease agents, chronic diseases and mental health (24). All other sectors of environmental public health are bound to be heavily influenced by this new factor (25).

Extreme weather phenomena that previously only occurred in other continents are now part of the life of Europeans. Heat waves, floods, storms, nature fires, changes in regional food yields,

disruption of fisheries, loss of livelihoods have already begun to take their toll on the health of several European countries (26,27). Heat-related mortality is estimated to increase by 1–4% for each 1° C rise in temperature, meaning that it could rise by 30 000 annual deaths by the 2030s and 50 000–110 000 annual deaths by the 2080s (28).

The epidemiology of waterborne diseases will be extensively modified due to rainfall and flooding and their consequences on sewage and groundwater levels. The UK Department of Health has observed that increased temperature is likely to affect the efficiency of chemical coagulation, a common procedure of water disinfection (27).

Climate also affects many infectious agents, vector organisms, non-human reservoir species, and the rate of pathogen replication. In regions where low temperature, low rainfall, or absence of vector habitat restrict transmission of vector-borne disease, climatic changes could cause the appearance of previously unknown diseases, even in the extreme form of epidemics. In some models, analyzed by the UK Department of Health, climate change will have an effect on NO<sub>2</sub> and SO<sub>2</sub> greater than that of human emissions (26). It has been shown that small changes in temperature variability, along with a shift in mean temperature, can greatly increase the frequency of extreme heat (29), which is preoccupying if considered in conjunction with the progressive aging and increasing urbanization of Europe's population (30). A study showed how ocean warming around the Faroe Islands will facilitate the methylation of mercury and its subsequent uptake by fish (31).

Studies report that the geographic range of ticks that transmit Lyme borreliosis and viral encephalitis has extended northwards in Sweden (32) and increased in altitude in the Czech Republic (33,34)

Another important problem is the population displacements following increase of sea levels and decreases in regional food and water supplies (35), which could literally recast the scenario of human settlements and socio-economic pressure in our continent. We have to be prepared for this event if and when it occurs (25).

However, we do not yet know enough to be certain about these future scenarios. Certain effects of global change could cancel each other out. For instance, it has been suggested that the negative effects of climate change for certain infectious diseases may be overestimated, and there could be even a positive impact for some of them [36,37,38]. Studies carried out by the UK Health Department have found no direct correlation between temperature raise and mortality in UK, implying that the human body may effectively adapt to gradual changes in average temperature (27). In fact, beneficial effects of climate change may include reduced winter deaths and disease events in some temperate countries, reduced exposure to aero-allergen in some regions due to lesser production or shorter season of pollen circulation, impairment of reproduction and survival of vectors (such as mosquitoes) in case of altered rainfall and excess heat, increases in regional crop yields in currently cold regions (39,40).

This is why we probably need to shift our focus from trying to ascertain what has happened in the past, more to what is happening now, and what could happen in the near future. And after we build up a more accurate picture of the situation, we need to re-invent our policy response mechanisms so that they become suitable to respond to a global and all-embracing threat, addressing the challenges that have already been identified in this respect: addressing informational

shortcomings, reducing poverty and inequities, promoting the development of new technologies, especially in food production and water processing, fostering behavioural changes in the population of the richest countries by population engagement, and improving coordination and accountability of global governance(35).

#### 4.2. Sustainability

The field of sustainability encompasses all strategies that can be used to decrease the impact on the environment by human activity. The potential in this area has been growing and its main applications being found in transport, energy, waste management and in the increasingly popular practice of carbon offset (being aware of one's carbon footprint).

Sustainability analysis can be conducted on every human activity. Private companies with a call for social responsibility have started to inform their customers on the CO<sub>2</sub> emissions associated with their production activities, and to undertake initiatives to counterbalance those emissions (carbon offset). The approach of sustainability analysis can also be used for health and health care-related issues. Some countries have started to calculate the excess CO<sub>2</sub> emissions determined by the activities of their health systems. Sustainability analysis is being applied on an ever larger scale, and it has the potential of becoming a statutory step of most public activity, as well as of a significant part of private one.

In 2004, the UN calculated that breastfeeding reduced milk industry waste, pharmaceutical waste, plastics and aluminium waste and reduced CO<sub>2</sub> emission (41).

Sustainability policies are promising because they have many advantages over most of the traditional instruments of environmental health practice. Sustainability policies:

- Primarily do not aim at curing health effects of environmental hazards, nor at reducing their impacts, but they are focusing on the sources of those hazards.
- Positively affect human health status ways, which operate synergistically and reinforce each other in virtuous cycles: environmental effects interplay with social, economic and cultural ones. As a consequence, their overall benefits are exponentially greater than those of other approaches (42).

However, sustainable policies are innovative and a strong drive is needed to introduce them. This drive must come from advocacy, education, and research. Health promotion and increased awareness of the problem also play a great role here: the most effective advocacy is the one coming from the citizens, who are in this case "empowered" to become responsible of something greater than their own personal health.

This means that nurturing the social responsibility of families, children, workers is important because they will decide whether to use public transportation, how to dispose of their garbage, how to heat their homes or how to choose what products to buy. At the same time, we should foster the attention of public administrations and private companies, because they provide citizens with the means to exert their environmental responsibilities, whether it be by building cycling lanes and garbage collection services or by choosing to guarantee the environmental sustainability of their activities and products.

Along with integration between different scientific disciplines, the specifics of sustainability will require the exploration of new ways to integrate research and policy, including new approaches to science funding policies and incorporating research into environmental management policies (43).

There is another opportunity to let sustainability enter into everyday practice and policy. The most famous example here is the Environmental Sustainability Index (ESI) but several others exist (44), and methods have been developed to simplify them (45) so that they can be applied to everyday practice and decision-making. The occasion to introduce them into practice and standardize them at an international level should be used.

#### **4.3. A human ecology perspective**

Over the last decades we have learned that the traditional paradigms of how we study and relate to the environment are no longer appropriate. Global climate change compelled us to acknowledge that the environment has changed and it may continue to change in unpredictable ways with unmanageable speed. Public health has to take into account the ecosystem perspective, which recognizes the inextricable links between humans and their biophysical, social, and economic environments, and that these links are reflected in a population's state of health. These include the traditional fields of air and water pollution, but also new fields such as deforestation, loss of biodiversity, climate change, urban growth, unsustainable production and consumption and demographic dynamics. Reconciling an ecosystem's health with the health of its human inhabitants is a new area of research, requiring input from scientists, community groups, decision-makers, and other interested parties (46).

Our goals will have to include not only physical well-being, but also social and mental well-being (47). The impact of the environment on the health-related behavior of citizens needs to be explored (48,49,50,51).

Environmental epidemiology research needs to focus more on studies integrating multilevel impacts of physical and social environments, including genetic and behavioral impacts on health and disease processes of populations (52). This perspective also requires us to re-think the scope of our methods and interventions, so as to adapt to the larger scale.

This approach should be also implemented in the field of practice: cooperation between different stakeholders will ease addressing existing threats and designing proactive policies that shape change (53).

#### **4.4. Inequality and environment**

Another challenge is the interplay between social inequality and environmental risk factors. Environmental hazards have the intrinsic feature of taking its heaviest toll on the most underprivileged: in no other field of health are the differences between socio-economic classes, between rural areas and urban areas, between high-income and low-income countries so marked (35). In most cases, the socially disadvantaged groups bear the greatest burden of environmental exposures: the poor, the elderly, children, the mentally disabled have all been proved to be especially vulnerable to environmental risk. And even gender-related differences have been postulated to exist in the hazards posed by global climate change (24). These gradients are evident across social strata, and there appears to be a trend towards growing segregation and widening social disparities (54). The disproportionate exposure of marginalized and disadvantaged groups stems from a number of mechanisms, including limited financial resources for risk reduction, hazardous or unprotected work, or poor and unsafe living conditions worsened by social segregation and stigma.

National health systems need to recognize that not all inequities will be mitigated or prevented and this will inevitably lead to a higher disease burden in disadvantaged population groups. Adequate

primary health care services and infrastructure should therefore be considered as an essential component of preventing, addressing and reducing social inequities in environmental health outcomes and need to be further strengthened. In addition, investments into national environmental surveillance systems and environmental protection measures may have a similar benefit for population health (54).

## **5. A long way forward**

### **5.1. The growing landscape of Europe's environmental information systems**

While we know that better information is the starting point for better action, information systems in environmental health are still poorly developed. There are however significant steps forward made:

In 2007, WHO Regional Office for Europe launched ENHIS - Environment and Health Information System (55), an information system on environment and health for the WHO European Region, designed to complement and implement the European Union's Public Health Action Programme 2003-2008. It is the first instrument to systematically uniform and link to each other national assessments, thus allowing international comparisons of the main environmental health indicators.

The European Environment Agency's EIONET – European Environment Information and Observation Network (56) is an extensive partnership involving hundreds of experts from 38 countries that is collecting and disseminating environmental data for the Agency's activities. EIONET also cooperates with Non-Governmental Organizations such as the International Society for Environmental Protection (ISEP) through its organ CEDAR, Central European Environmental Data Request Facility (57).

On a larger scale, Europe is well represented in the Group on Earth Observations (GEO) (58), both by the European Commission and by single Member States. Launched following the 2002 World Summit on Sustainable Development and agreements by the G8 countries, this initiative has set itself the ambitious goal of establishing a global network of content providers for policy-making, the GEOSS (Global Earth Observation System of Systems) (59). One of its first results at the European level will be the activation of the ICOS (Integrated Carbon Observation System) (60), which will routinely monitor Europe's greenhouse emissions starting from 2012, also fulfilling the monitoring obligations of Europe under the United Nations Framework Convention on Climate Change (UNFCCC).

Geographic Information Systems (GIS) have now been used for public health research with interesting results for a few years in different ways: disease surveillance, health access and planning, community health profiling and risk analysis (61). Unlimited access to simple, web-based geospatial mapping systems makes resort to advanced technical knowledge unnecessary; not taking advantage of these opportunities is a severe waste of resources (62). This is why we advocate the integration of these data and indicators in practical applications in Europe (63). These can include fields as diverse as health promotion, decision-making, and healthcare services planning.

The Small Area Health Statistics Unit (SAHSU) was established in 1987 following a recommendation by the Black Enquiry into the incidence of leukaemia in children and young adults near the Sellafield nuclear plant. Since this time, the main aim of SAHSU has been to assess the risk of exposure to environmental factors to the health of the population, with an emphasis on the use and interpretation of routine health statistics.

SAHSU is currently undertaking a number of major research projects (SAHSU Studies), with increasing attention being given to exposure assessment. A main focus is the expansion and regular updating of the SAHSU databases as well as the development of spatial statistical analysis methods. SAHSU works with a multi-disciplinary team that collaborates extensively with other departments within Imperial College and with external institutions in the UK, Europe and the USA.

SAHSU has also developed a software tool for environmental health risk assessment, the RIF (Rapid Inquiry Facility). Initially intended for internal use, it was subsequently modified for implementation in several European countries within the EUROHEIS project ( EUROHEIS ). Current collaboration with CDC, the US Centers for Disease Control in Atlanta, in their Environmental Public Health Tracking Program (CDC) is working on enhancing the RIF to make it more adaptable and user-friendly (64).

Finally, the European Public Health Association (EUPHA) provides a document repository and remote site search system for its members. Our information and document database (EUPHApedia) aims to provide a wealth of information for Public Health Professionals (65). EUPHApedia also offer an External search system which has indexed other interesting websites, for example the European Observatory on Health Systems and Policies, the European Journal of Public Health (EJPH) and the EU Health Portal. EUPHApedia provides more than 500 documents related to environment health on repository search and more than 2500 documents in external search, proving to be a useful source of information for professionals in the field.

## **5.2. Linking research and policy**

Single European states attempting to intervene in environmental health and ecology are increasingly focusing on implementing international guidelines and on doing what international institutions cannot do: directly intervening in the enforcement of regulations and standards, and carrying out health promotion and education activities.

In July 2010, the Protocol on Strategic Environmental Assessment to the UNECE (United Nations Economic Convention for Europe) Espoo Convention entered into force (66). It was signed back in May 2003 at the Ministerial "Environment for Europe" Conference in Kiev, Ukraine, by 35 governments and the European Community, to supplement the Convention on Environmental Impact Assessment (EIA) in a trans-boundary context. The protocol sets forth that all Parties will evaluate the environmental effects, including environmental health impact assessment, of their official plans and programmes, also addressing policies and legislation.

This Strategic Environmental Assessment could become the main instrument for sustainable development, by allowing the identification and prevention of possible environmental impact from the earliest stages of decision-making, with a view of bringing environmental objectives to the same level as socio-economic ones.

The presence of health as a key element to be taken into account is ensured by the European Charter on Environment and Health endorsed by the European Ministers of Health and of Environment in 1989.

The Protocol emphasizes the need for greater public involvement at all stages of policy-making, through wider availability of both information and feedback opportunities, according to the principles of the Aarhus convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

Several European countries have enacted comprehensive strategies addressed at managing environmental sustainability, such as that of Netherlands (67), which has drawn considerable international attention (68). The non availability of skilled human resources is a limiting factor, especially in Eastern Europe (1,69). Education planners and trainers are expected to invest greater efforts in filling the competence gap (70).

## **6. Conclusions**

The conclusions of this report focus on the actions to be undertaken under the four pillars of EUPHA (policy, research, practice and training and education).

### **6.1. Implications for policy**

- Intersectoral cooperation is no longer an option, but the only way to address threats that cross the boundaries of academic and governmental sectors.
- The role of international organizations in setting in environmental policy-making should not be underestimated and is often seen as an incentive for national and regional governments to become or continue to be active.
- Health needs to be better integrated into the agenda of environmental policy. It is important to develop multidisciplinary regulations.

### **6.2. Implications for research**

- Public health researchers have a significant responsibility for undertaking research that will assist society to understand and avert the health impacts of global environmental changes. They are expected to expand and strengthen the knowledge of the implications of a depleted or destroyed natural environment for populations' health.
- Data on climate change and from geographic information systems must be crossed with data on health outcomes the moment they become available. Researchers should stay in tune with the developments of the ever-changing landscape of Europe's environmental information systems.
- Research should be intensified with regard to exposures and potential health risks concerning newly emerging products such as nanomaterials which are increasingly being used in commercial applications. We know little about the magnitude or extent of health risks they are likely to exert to workers and consumers. The industrial application of nanomaterials is running far ahead of scientific knowledge and understanding of their health impacts. Similarly, we still do not know enough on POPS (Persistent Organic Pollutants) and endocrine disruptors: how significant is their impact on human health,
- Given that gene-environment interactions underlie almost all human diseases, the public health significance of genomic research on common diseases with modifiable environmental risks is based on improving existing approaches to identifying and modifying environmental risk factors to better prevent and treat disease (71). There is urgent need to expand the knowledge of gene-environment interactions through intensified research.
- Finally, while maintaining the focus on evaluating the burden of disease, directing more emphasis on evaluation the efficacy of policies will increase the potential of research to affect decision-making.

### **6.3. Implications for practice**

- Existing procedures and technologies must never cease to be discussed and improved. New solutions can be found and put to trial for managing the environmental health hazards. They usually involve complex processes, like those related to food safety.
- Focus should shift from measuring environmental levels of pollutants more to bio monitoring. How to implement it and interpret its results and how to integrate it into existing reporting systems should receive more attention.

- International projects tend to lack coordination: we need projects on the same goals and with the same measurement units, so that they can be compared.
- Most environmental processes are on a global scale. We should however not ignore the still significant regional differences. For this reason, local activity should be based on local evidence and priorities.
- A new challenge of urban health needs to be defined and explored, following the track outlined in Lodz (2<sup>nd</sup> European Public Health Conference, 2009). We need to address the health risks and health outcomes, particular to the urban environment, the existence and the effects of urban health networks, the urban health indicator systems, and to integrate this knowledge into the environmental health practice.

#### **6.4. Implications for education and training**

- Education and training on environmental health in Europe needs to focus both on teaching health professionals in policy fields that have a significant effect on health as well as further developing environmental competences of public health professionals. (1, 70).

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